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Significance of New Reserve Regulations

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N JULY, 1959, Congress passed Public Law 86-114, a bill which amends the ules regarding the classification of nember banks for reserve purposes, hanges the authority of the Board of overnors of the Federal Reserve Sysem in regard to determining reserve equirements, and permits the board to llow member banks to include vault ash as a part of legal reserves.[1] Partly ponsored by the Federal Reserve, the ct was passed in the guise of technical mendments of a noncontroversial ature.[2] Far from being purely technial in character, however, it will be ontended here that the significance of ublic Law 86-114 is that it will inrease member bank earnings without mproving or necessarily affecting ecoomic conditions related to growth and tability. In fact, the new law can be justified only upon the highly questionable premise that member bank earnings are "too low," and that the Federal Reserve should assume a direct responsibility for improving the situation. This paper will discuss the amendments, examine alternative means of implementation, and analyze the probable effects of the amendments upon economic conditions after the new rules are fully implemented.

Changes in Reserve Regulations

In general, the changes included in Public Law 86-114 broaden the Federal Reserve's power to classify member banks for reserve purposes and to specify the type of assets which may comprise legal reserves. In addition, the provisions restrict the Federal Reserve's power to raise reserve requirements and provide for the termination of the Central Reserve City (CRC) classification three years from the date of the act.

Specifically, the act:

(1) authorizes the Board of Governors

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[1] U.S., *Congressional Record,* 86th Cong., st Sess., 1959, Vol. 105, p. 13127; and *ederal Reserve Bulletin,* August, 1959, pp. 88-90.

[2] U.S., *Congressional Record,* 86th Cong., st Sess., 1959, Vol. 105, pp. 12194-95; and *ederal Reserve Bulletin,* April, 1958, pp. 27-29.

to permit member banks to treat vault cash as reserves; (2) reduces from 13 per cent to 10 per cent the minimum reserves against demand deposits that member banks in central reserve cities must maintain; (3) reduces from 26 per cent to 22 per cent the maximum reserves against demand deposits that member banks in central reserve cities may be required to maintain; (4) increases from 20 per cent to 22 per cent the maximum reserves against demand deposits that member banks in reserve cities may be required to maintain; (5) authorizes the Board of Governors to permit a member bank located in a central reserve or reserve city to carry lower reserves than other banks in the same city, based upon the nature of the bank's business rather than according to its geographical location . . . ; and (6) provides for the termination of the classification "central reserve cities" on July 28, 1962.[3]

On balance, the provisions of Public Law 86-114 weaken rather than strengthen the Federal Reserve's monetary powers, for with minor exceptions the additional discretionary powers provided in the act concern the reduction but not the increase in reserve requirements affecting member banks.

The new reserve regulations are mandatory in regard to the changes in the reserve requirement ranges and with respect to the termination of the CRC classification. Other provisions of the act are enabling in character and grant to the Federal Reserve more discretion regarding the treatment of legal reserves and the classification of member banks for reserve purposes. So far as the amendments affect the reserve ranges — and therefore the *potential* as opposed to *actual* reserve requirements — the mandatory changes included in the act should have no initial effects and should not be of any immediate concern to monetary policy.

Reasons for the Changes

Legislative action usually involves a blend of special interest group pressure, public apathy, and perhaps a touch of altruism. Public Law 86-114 is no exception. The reserve changes, couched in technical terms, were beyond the public's interest or comprehension, and legislative hearings indicated a lack of clear understanding of what the act would accomplish.[4]

Banking and government spokesmen for the reserve rule changes emphasized the advantages to be derived from the amendments and stressed the need to alleviate alleged inequities presently existing in the system.[5] Partly because the provisions of the act are in line with the Federal Reserve's apparent policy of gradually reducing the level and differences in reserve requirements, the Federal Reserve supported all provisions of the act with the exception of the amendment terminating the CRC classification.[6]

A change in the treatment of vault cash was recommended as an economy measure to reduce currency transfer as well as a means to correct apparent inequities between individual banks within the system. The alleged inequities arise from the fact that some banks may be subject to an earnings penalty as the nature of their operations (or their geographic location) requires a relatively higher degree of liquidity; hence their vault cash requirements may be much higher than for other banks. The first steps in implementing changes in the treatment of vault cash were made effective in December, 1959.[7]

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[3] *Federal Reserve Bulletin,* August, 1959, p. 888. Amendments pertain to Section 19, Title 12, of the Federal Reserve Act.

[4] U.S. Senate, *Member Bank Reserve Requirements,* Hearings before the Committee on Banking and Currency, 86th Cong., 1st Sess. on S. 860 and S. 1120, hereinafter referred to as *Senate Hearings.* See also U.S. House of Representatives, *Member Bank Reserve Requirements,* Hearings before Subcommittee No. 2 of the Committee on Banking and Currency, 86th Cong., 1st Sess., on H.R. 5237, hereinafter referred to as *House Hearings.*

[5] *House Hearings, op. cit.,* pp. 35-38 and *passim.*

[6] *Senate Hearings, op. cit.,* p. 41; *House Hearings, op. cit.,* p. 28.

Because termination of the CRC classification will be of direct benefit only to the 31 banks so classified, most of the supporting testimony for the termination came from spokesmen for the large banks in the New York and Chicago areas.[8] Arguments in favor of the termination stressed the change in the function of legal reserves and emphasized the similarities between banks in the CRC and Reserve City (RC) classifications. Spokesmen for the larger banks argued that the CRC classification, with its higher reserve requirements, was originally believed to be necessary because banks in these cities had a higher deposit turnover, held large amounts of volatile deposits of other banks, and had greater opportunities to keep fully invested. For these reasons the banks were said to require a higher degree of liquidity. However, it has long been recognized that required reserves are of little value to a bank for liquidity purposes and in fact may be treated as illiquid assets. The principal function of required reserves today is to provide an effective tool for monetary control. Bank spokesmen thus argued that, because reserves no longer served any significant liquidity function, the continued discrimination between the two city reserve classifications was unwarranted and indefensible.

The second reason given for eliminating the CRC classification concerned the shifting location and importance of interbank deposits. Statistical evidence presented at the hearings indicated the growing importance of interbank deposits in the reserve city areas and a corresponding decline in the importance of interbank deposits in the cities of New York and Chicago.[9]

Testimony supporting the termination of the CRC classification would provide equal support for a change in criteria of bank classification for reserve purposes. Admittedly, the present geographic basis of reserve classification is unsatisfactory and may result in inequities between individual banks. If nongeographical criteria were used, banks with similar economic attributes could be treated alike without removing the Federal Reserve's power to differentiate between reserve classifications for control purposes.

The new legislation recognizes the unrealistic basis presently used in classifying member banks for reserve purposes and allows the Federal Reserve to make exceptions to a rigid classification along geographic lines. Unfortunately the discretionary power is onesided and permits downward but not upward adjustments in reserve classifications.

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[7] See *infra*, p. 7. The December ruling effectively included only "excess" vault cash as a part of legal reserves.

[8] *Senate Hearings, op. cit.*, pp. 56-64, 83-91, and *passim*.

[9] *House Hearings, op. cit.*, pp. 221-38.

In favoring changes in the reserve requirement limits of central reserve city banks, the Federal Reserve emphasized the leverage effect of lower reserve requirements.[10] As reserve requirements are reduced, further reductions have potentially greater effects upon the banking system's operations. For example, variations around an average reserve requirement of 10 percent could have a considerably greater impact upon monetary conditions than equivalent variations about an average requirement of 20 percent.[11] Thus as reserve requirements are gradually reduced, the implementation of monetary policy becomes a more delicate and sensitive operation. However, to the extent that the Federal Reserve places increasing emphasis upon open-market operations in deference to changes in reserve requirements, the leverage effect has less importance as an influence upon the efficacy of monetary policy.

Implementing the Changes

Basically implementation of the provisions of Public Law 86-114 involves an expansive influence upon the money and credit markets. The ultimate effects upon economic conditions generally will depend upon the extent, nature, and timing of "defensive" offsetting actions taken by the Federal Reserve when implementing the reserve rule changes; but to single out any one influence upon the reserve position of member banks and prescribe appropriate offsetting action oversimplifies the *modus operandi* of the Federal Reserve System.[12] The Federal Reserve must consider the net effect of all relevant influences upon member bank reserve positions rather than attempt to treat each influence separately.

In establishing policy objectives, then, the Federal Reserve will consider the changes in reserve regulations and the need to offset such changes as independent operations. Given a specific goal concerning the reserve position of the banking system (for example, a predetermined level of free reserves), the Federal Reserve will endeavor to account for all influences upon the reserve position and contribute the net expansive or contractive influence necessary to maintain the desired reserve position. Whether the reserve positions of member banks are eased as a result of Treasury operations, gold flows, reserve rule changes, or any combination of other factors, appropriate Federal Reserve action taken to offset the influences would not differ in regard to the nature of the particular influences involved.

The expansive influence resulting from the implementation of the new reserve rules may be timed, as the December ruling has been, to coincide with seasonal or cyclical conditions which would restrict reserves unless offset in some manner. By timing the implementation of reserve rule changes to coincide with a desire to ease money and credit conditions, the initial impact of the reserve changes may enhance the efficiency of monetary policy — at least for the period of time when implementation takes place.

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[10] *House Hearings, op. cit.*, pp. 20-24, 26.

[11] The argument is valid only with respect to absolute changes in reserve requirements. Equal *relative* changes should produce identical results at various assumed reserve requirement averages.

[12] E.g., Robert V. Roosa, *Federal Reserve Operations in the Money and Government Securities Markets* (New York: Federal Reserve Bank of New York, July, 1956).

Whether implementation of the reserve rule changes involves accurate timing or "defensive" action, general economic conditions will not be altered significantly; for it may be assumed that the implementation of the new reserve regulations involves the selection of one of several alternatives which could be used to achieve essentially the same monetary results. In this respect the reserve rule changes may be implemented initially as substitutes for open-market purchases or lower reserve requirements which would have been necessary in the absence of the change in reserve regulations.

Implementation of the changes in the treatment of vault cash involves an increase in total and in excess reserves. For the banking system as a whole, the inclusion of vault cash as a part of legal reserves is tantamount to reducing reserve requirements,[13] but the apparent intent of the recent amendments to the Federal Reserve Act is to reduce the disparity in reserve burdens on individual banks rather than to lower reserve requirements generally. Hence a blanket inclusion of vault cash as legal reserves should not be contemplated unless it is accompanied by increased reserve requirements.

Recognizing the disparity in the importance of vault cash to individual banks (as indicated in Table 1), the Federal Reserve has taken steps to equalize reserve burdens. The December changes in the treatment of vault cash enable banks with relatively large demands for vault cash to meet their cash requirements without being forced to remain relatively more liquid than their competitors.[14]

Implementation of the change in reserve classifications is mandatory at the end of three years from the date of the act (on July 28, 1962), but the Federal Reserve undoubtedly will anticipate the termination of the CRC classification by reducing and eventually eliminating the present differential in requirements for the CRC and RC classifications. Judging from the trend in reserve requirements during the past decade,[15] the eventual elimination of the differential in reserve requirements may be viewed as a continuation of an established policy of the Federal Reserve. Thus a reduction in requirements for the 31 banks in the central reserve cities rather than an increase in requirements for the reserve city banks may be anticipated and partly justified as relatively less disruptive to monetary conditions. A reduction of 1.5 percent in the reserve requirements for the central reserve city banks would free an additional $408 million in excess reserves for the 31 banks of New York and Chicago. If requirements were increased by 1.5 percent for those banks in the reserve city areas, their *excess* reserves would fall by approximately $707 million. However, the possibility exists to adjust reserve requirements of all classifications so as to avoid any change in the level of excess reserves.[16]

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[13] The effect upon excess reserves would be the same in both cases; however, a technical distinction could be made in that a reduction in requirements does not change the supply of legal reserves, whereas the inclusion of vault cash increases legal reserves.

[14] The Federal Reserve's December ruling permitted country banks to count vault cash in excess of 4 percent of their demand deposits as a part of legal reserves; city banks may count vault cash in excess of 2 percent of demand deposits. In each case the percentage is above the present average holdings of vault cash, as indicated in Table 1. *Wall Street Journal,* Midwest edition, December 1, 1959, p. 3.

[15] *Federal Reserve Bulletin,* November, 1959, p. 1364. The last increase in reserve requirements was made effective January 25, 1951; all subsequent changes have reduced the requirements for each of the reserve classifications.

Economic Significance of the Changes

On the assumption that the full implementation of provisions of Public Law 86-114 will be effected gradually and will be fully offset through appropriate timing and open-market action, the economic effects of the changes will be insignificant except in regard to a distributive effect favoring the banking system through an increase in earning assets and income. If the reserve rule changes were fully implemented, approximately $2.5 billion in additional earning assets could be acquired by the banking system if the Federal Reserve offsets the reserve changes through security sales to the banks. Assuming that the banks could invest at rates prevailing in the first six months of 1959 (2.69 percent), the annual operating income of banks would increase by about $67 million.[17]

Banks directly benefiting as a result of higher excess reserves would be able to augment their earnings through an exchange of redundant reserves for earning assets, unless the non-bank public absorbed the securities sold by the Federal Reserve as an offsetting measure. In the latter case the immediate effect would be a drop in the supply of legal reserves within the banking system. But as the public's purchases would reduce their deposits in the commercial banks (and therefore reduce required reserves), the banks would not lose excess reserves to the extent of the drop in deposits.

Of course, the Federal Reserve could make open-market sales in an amount sufficient to eliminate all excess reserves which were created as a result of the rule changes. The amount necessary would depend upon the required reserve percentage. Thus, where R = required reserve as a percent of deposits, E = excess reserves created, and Sp = security sales to the public necessary to eliminate the excess reserves, then $Sp = \frac{E}{1 - R}$; and when R = 20 percent and E = $2 billion, then Sp = $2.5 billion. On the assumption that banks would not choose to remain more liquid and would endeavor to shift out of redundant cash and into earning assets, the eventual result of the Federal Reserve's offsetting sales to the public would not differ materially from the impact of direct sales to the banks.

All provisions of the new reserve regulations portend an initial increase in bank liquidity.[18] The inclusion of vault

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[16] See *Federal Reserve Bulletin*, October, 1959, p. 1259. All calculations based upon August, 1959, data.

[17] *Ibid.*, p. 1320.

[18] Required reserves are treated here as illiquid assets. Hence any reduction in reserve requirements means more liquidity for the banking system.

Table 1. Vault Cash Holdings of Member Banks, by Classes, June 6, 1957

Class and size of bank (total deposits in millions of dollars)	Number of banks	Total vault cash (millions of dollars)	Percentage of net demand deposits	
			Average[a]	Range of middle 50 percent[b]
All member banks	6,445	2,065.2	2.1	
entral reserve city banks, total	32[c]	171.5	.7	
Over 1,000	10	146.1	.7	
500 to 1,000	4	7.0	.4	0.3–0.7
100 to 500	8	11.0	.7	.5– .9
Under 100	10	7.4	2.2	1.6–3.2
eserve city banks, total	282	652.6	1.7	
Over 1,000	8	170.4	1.7	1.2–2.0
500 to 1,000	19	118.3	1.5	1.0–1.7
100 to 500	100	270.8	1.8	1.2–2.5
50 to 100	57	54.3	2.0	1.4–2.5
25 to 50	49	28.2	2.8	1.8–4.0
Under 25	49	10.6	2.8	2.1–4.5
ountry banks, total	6,131	1,241.1	3.5	
100 to 500	60	200.8	3.0	2.4–3.9
50 to 100	128	162.2	3.1	2.2–3.9
25 to 50	286	192.8	3.5	2.6–4.3
10 to 25	926	292.6	3.8	2.7–5.0
5 to 10	1,322	199.2	3.9	2.7–5.4
Under 5	3,409	193.4	3.9	2.4–5.7

[a] Based on aggregate figures for each class or size group.

[b] Based upon ratios computed for each individual bank, with banks in each size group rayed in order of size of their percentages of vault cash to net demand deposits, i.e., one-urth of the banks in each size group have ratios of vault cash to net demand deposits below e smaller figure shown and one-fourth have ratios above the higher figure shown in the nge.

[c] A merger of the J. P. Morgan and Company and the Guarantee Trust Company nks, effected in April of 1959, reduced the number of CRC banks to 31.

Source: Board of Governors of the Federal Reserve System, "Proposed Legislation for evision of Reserve Requirements," U.S. House of Representatives, *Member Bank Reserve equirements,* Hearings before Subcommittee No. 2 of the Committee on Banking and rrency, 86th Cong., 1st Sess., on H.R. 5237.

sh as a part of legal reserves would gment excess reserves for the bank- g system, whereas reclassifying certain nks for reserve purposes would in- ease their liquidity. If coupled with wer central reserve city requirements, minating the reserve requirement differential would release a substantial amount of reserves and hence increase the system's liquidity. The only provision implying a potential decrease in excess reserves is the increase in the maximum reserve requirements for the banks in the reserve city classification.

With the additional liquidity supplied through the reserve rule changes, member banks would be able to acquire more earning assets.[19] If open-market operations are used to reduce the excess reserves which would be created, and if we assume no change in the liquidity preference of the non-bank public and no change in the member banks' demand for liquidity, then the sales by the Federal Reserve would be absorbed by the banks. Thus bank earnings would rise unless security yields fell or bank operating costs increased, and there is nothing involved in the process described which would cause these two conditions to prevail. The only situation in which bank earnings would not increase as a result of offsetting the reserve rule changes through open-market operations would be where the public acquired the securities sold by the Federal Reserve and where the Federal Reserve sold enough securities to absorb completely the additional excess reserve suggested through the reserve rule changes. This exception is predicated upon a necessary change in the public's liquidity preferences; without such a change the member banks would be the principal purchasers of the securities sold by the Federal Reserve.

Although the new reserve regulations increase the liquidity of the banking system, not all banks will be affected in an equal manner. The relative distribution of reserves, and eventually of earning assets, will shift in favor of the individual banks most directly involved by the reserve changes. For example, the vault cash change will be of greatest importance to the country banks; however, as indicated in Table 1, there are relatively few country banks with vault cash exceeding 4 percent of their demand deposits. The same is true of the city banks, which normally carry much less vault cash than necessary to benefit from the Federal Reserve's December ruling.

Aside from distribution effects stemming from the reserve rule changes, other important economic effects could result if interest rates and/or the banking system's willingness to lend changed materially. However, there is no reason to expect either a noticeable interest rate effect or a shift in the banking system's desire for liquid assets to result from the implementation of the reserve rule changes. The Federal Reserve's open-market sales as an offsetting action should nullify any downward pressure on interest rates which would otherwise be present as a result of the increased liquidity position of the banking system. Also, the decrease in excess reserves from the offsetting open-market sales by the Federal Reserve should counteract the influence of the reserve rule changes upon the banking system's willingness to lend.

The banking system could expand loans by shifting out of securities, but such action could not be caused by the implementation of reserve rule changes and any apparent connection would be spurious.

While it is true that the new reserve

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[19] If the Federal Reserve offsets the inclusion of vault cash as legal reserves by raising reserve requirements, this would not result in an increase in earning assets.

les do permit the Federal Reserve expand credit to a greater degree an was possible under conditions ex-ting before the reserve rule changes ere made, the additional powers were ot needed and in all probability will ot be fully utilized in the foreseeable ture. At present, and without further nplementation of the reserve rule anges, the Federal Reserve could per-it a credit expansion equal to more an two times the present money pply.[20]

Conclusions

While making some desirable changes reserve regulations, Public Law 86-14 holds more promise as an influence pon member bank earnings than on conomic conditions generally. Conse-uently, implementation of the changes ould proceed cautiously and should governed by demonstrated economic eed; changes should not be undertaken simply as a means to improve bank earnings.

Two provisions of the act which are most objectionable concern the mandatory termination of the CRC classification and the reduction in maximum reserve requirements. In both cases, powers of the Federal Reserve are weakened unnecessarily and without any compensating benefit other than in the form of a windfall for the 31 banks presently included in the CRC classification. As for the reduction in maximum reserve requirements, the change is indefensible on any grounds other than the desire to abandon reserve requirements as a useful monetary tool.

The value of other provisions of the act depends upon the manner of their implementation. Treating vault cash as legal reserves is defensible as a means to reduce inequities so long as the direct benefits accrue to those banks whose abnormal demands for vault cash result in a measurable earnings penalty. A blanket inclusion of vault cash as a part of legal reserves would be equivalent to a reduction in reserve requirements and therefore defensible only as a countercyclical measure; such a change should not be made merely as a means to augment bank earnings.

The flexibility allowed the Federal Reserve in deciding reserve classifications for individual banks is a desirable provision of the law. However, the provision should have extended the Federal Reserve's power to make reclassifications in both directions.

The Federal Reserve System, being a strange hybrid combination of private enterprise and government administration, must be sensitive to the public interest and particularly to the dangers of confusing it with banker interests. Otherwise the continued existence of the Federal Reserve as an independent institution may be jeopardized. Unless the need to raise bank earnings is clearly demonstrated, the Federal Reserve should not implement any reserve rule change without a clear indication that the expected economic benefits will outweigh the importance of how the change may affect member bank earnings.

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[20] Assuming no change in the *composition* earning assets held by the banking system, e reduction of reserve requirements to the gal minimum would provide additional ex-ss reserves of $6,426 million, or an amount fficient to support additional demand de-osits of $69,735 million, assuming that the ederal Reserve increases reserve credit by amount equal to the currency drain that sults from the monetary expansion.

If the Federal Reserve expands reserve edit to the legal maximum, assuming no ange in gold reserves, currency outstand-g, or in the composition of Federal Reserve abilities, then the Federal Reserve can sup-y an additional $7,921 million in excess serves. Adding this to the amount of ex-ss reserves which could be supplied by wering reserve requirements, a credit ex-ansion of $155,645 million in new demand posits theoretically could occur. Calcula-ons based upon data included in *Federal eserve Bulletin,* November, 1959, p. 1365.

The Seaway and Chicago: Growth Not Explosion*

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EW IF ANY capital improvements of he last half century have evoked such nrestrained enthusiasm as has the St. awrence Seaway development. Cities arge and small along the Great Lakes ave seen in this new deep-draft conection with the world's oceans the ouchstone to their own economic forunes. Chicago has been no exception. stimates of Metropolitan Area emloyment growth attributable solely to he Seaway have ranged as high as 1.5 nillion new jobs. Total population vithin the six-county unit[1] has been estimated as high as 9 million by 1975 — a 50 percent increase in some sixteen years — resulting largely from the impetus to growth given by St. Lawrence Seaway improvement.

Such estimates for Chicago and for other Great Lakes Metropolitan Areas have been inspired more by enthusiasm than by analysis. It is our purpose here to suggest a more realistic estimate of the possible impact of Seaway improvement on the economic growth of the Chicago Standard Metropolitan Area. It will be argued that within the Chicago Area the Seaway can be a major positive economic stimulus only to the extent that it (1) carries significant additional industrial freight into and out of the Metropolitan Area; (2) results in a detectable alteration of the existing pattern of market possibilities and material availabilities for Chicago Area manufacturers; and (3) gives rise to new employment which is numerically significant in volume compared with employment growth already implied by trends now operative within the area. Only after analyzing the effect of these stimuli can the improved St. Lawrence Seaway be seen in its true perspective as a potential contributor to the economic development of the Chicago Standard Metropolitan Area by 1965.[2]

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* For a more detailed and inclusive treatient, see J. A. Russell, J. D. Fellmann, and I. G. Roepke, *The St. Lawrence Seaway: ts Impact, By 1965, Upon Industry of Ietropolitan Chicago and Illinois Waterwayssociated Areas* (Chicago: Illinois Division f Industrial Planning and Development nd Chicago Association of Commerce and ndustry, 1959).

[1] The original Standard Metropolitan Area – composed of Cook, Du Page, Kane, Lake, nd Will counties, Illinois, and Lake County, ndiana — was recently expanded to include IcHenry County, Illinois, and Porter County, Indiana. Because data are so far available only for the smaller, six-county unit, all references in this paper will be to the original Standard Metropolitan Area, not to the current "Chicago, Illinois-Northwest Indiana Standard Metropolitan Statistical Area."

The Seaway as a Freight Carrier

Chicago has long been recognized as the classic transportation center. Its unsurpassed position as a focus of the nation's railroads, highways, airlanes, pipelines, and interior waterways has resulted from and contributed to the Metropolitan Area's economic growth and complexity. Since its initial improvement during the early 1930's, the St. Lawrence Seaway has been part of that assemblage of transportation media serving the Chicago Area. With its improvement and opening to deeper-draft vessels in the 1959 navigation season, however, the Seaway was suddenly singled out by many as a strikingly new and significant addition to the city's transportation complex; it was now expected to make a really major contribution to the total freight movement of the Chicago Area. These expectations, however, do not seem completely consistent with the facts.

There are certain assumptions, based upon logic and upon past experience which we may accept. It is, for example, generally accepted that ocean shipping will move as far into the interior as possible — if opportunities exist to discharge and load cargo. This means that Chicago will be the destination of a large proportion of the ships entering the Great Lakes. We may further assume, based on past experience and the lack of contradictory evidence, that Chicago will be in 1965, as it has been in the past, the most important single port for Seaway-borne traffic. If these assumptions are valid, Chicago may expect in 1965 to receive or ship about 40 percent of all overseas tonnage moving via the St. Lawrence. This still does not enable us to estimate the additional volume which Seaway traffic may add to movements into and out of Chicago. For such estimates, we must examine probable total Seaway volumes.

Table 1 presents our estimates of the total volume of traffic likely to move on the Seaway and the portion of this which is likely to be industrially significant to Chicago. The capacity of the Welland Canal presently sets the upper limit of goods which may be carried on the Seaway system. Our estimate of a total transit capacity of 50 million tons may be classed as a moderate estimate. Deducting present movements, we find a capacity for new tonnage of some 27,600,000 tons. From this must be

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[2] There were three reasons for using 1965 as the terminal date for the estimates in this study: (1) it was the date suggested by the agency which sponsored the research; (2) it is probably as far in the future as estimates of reasonable reliability can be made at this time; and (3) policy decisions on the expansion of economic activity which are to take effect by 1965 must be made very soon and this period is therefore of greatest interest.

Table 1. Estimated Availability of New Industrial Tonnage at Port of Chicago via Welland Canal by 1965[a]
(In short tons)

tal capacity of Welland Canal (estimated)		50,000,000
Less tonnage moved through Welland Canal (1957) prior to opening of improved Seaway		22,372,538
tal new tonnage above Lake Ontario (estimated)		27,627,462
Less tonnage not useful to Chicago industry (see text):		
Iron ore	4,400,000	
Grain	3,000,000	
Coal, coke, petroleum	2,000,000	
Canadian traffic	2,800,000	
Total		12,200,000
tal new bulk and general cargo other than above		15,427,462
timated absolute maximum share Chicago will receive (40 percent)		6,170,985

[a] Data on actual Welland Ship Canal tonnages are from Canada, Dominion Bureau of atistics, *Canal Statistics* (Ottawa: 1958), Table 16. Estimates are ours; 1957 traffic was ghtly below that of 1956, and 1958 traffic was still lower.

ducted both materials which will not ach Chicago — such as Canadian affic and much of the Labrador iron e — and traffic which, even if it flows rough Chicago, will not be industri- ly significant in terms of its contribu- on to manufacturing employment — ch as grain, coal, and petroleum ipments. If Chicago continues to re- ive her present share of overseas Sea- ay traffic, there will be capacity to ove about 6 million additional tons of dustrially significant materials and oducts into and out of the Chicago rea. This figure of 6 million tons ems to us the most realistic estimate hich can presently be made, and we all use it in our further presentation. is worth noting, however, that no sential part of our argument would changed were Chicago to receive the tire 15 million tons conceivably ac- ssible to her.

The 6 million tons we estimate to be ossible, if all realized, would constitute a sizable increment in the Seaway movement to and from the Chicago Area — an overseas traffic which amounted to no more than 327,000 tons in 1957. However, it would not constitute a major addition to the already huge total freight movements of the Chicago Area. The volume already moving into and out of Chicago is so great that by our estimates of Seaway volume, 1965 Seaway industrial tonnages will represent an increment of no more than 1 to 2 percent of the *present* total traffic flow of Chicago (Table 2). It must always be remembered that it is only through *additional* traffic that the Seaway can have a positive impact. Mere diversion of traffic from other media will not increase Chicago's economic potential.

Admittedly, new Seaway tonnage may have a somewhat greater relative significance than these estimates of volume would imply. On the basis of past experience, the most important

Table 2. Total Traffic of Chicago, 1957
(In short tons)

By rail, not including coal[a]	117,500,000
By rail, coal only	8,000,000
By Illinois Waterway barge	15,000,000
By lake carriers	60,000,000
By truck	92,710,000
By pipeline[b]	54,325,000
By air	122,650
By overseas shipping	326,650
Total	347,984,300

[a] Based on originations only; the total used is twice the originations.
[b] Based on average capacities of pipelines.

new traffic for Chicago industries would be general cargo movements. This category would include semifinished materials coming in for further manufacture and products of Chicago's industries being shipped out to markets. Seaway officials estimate that general cargo movements may comprise as much as 15 to 20 percent of the traffic to be added by 1965, or up to some 5 million tons of the anticipated 27,600,000-ton increase. If 40 percent of this additional general cargo goes to or from the Port of Chicago, about 2 million tons or some one-third of all predicted new tonnage will be general cargo; this would be an increase of 600 percent over the 1957 overseas general cargo traffic of the port.

Additional movements of general cargo are almost certain to prove a mixed blessing to the Chicago Area. A study of commodities passing through the Port of Chicago between April and July, 1959, the first three months of improved Seaway operation, indicates that a significant part of the volume was made up of imports directly competitive with products of Chicago's industries. Important among the imports were steel mill products (which were moving into Chicago in much greater volumes than in previous years), basic hardware and tools, cars, and a miscellany of toys, glass and chinaware, sewing machines, and so forth. Import competition of this sort certainly could retard the growth of Chicago's own industrial employment.

From the standpoint of freight movements alone, then, the claims for great new industrial employment and economic growth in Chicago — at least by 1965 — seem unwarranted. Although Seaway improvement gives promise o a great volume increase in the freight traffic significance to Chicago of the Seaway route, its relative importance among the transportation media serving the area will be unchanged. Its contribution to the potential economic growth of Chicago will be — in these terms — minor.

The Seaway and Chicago's Industrial Potentials

The attractiveness of an area as an industrial location may be enhanced to the extent that an improved transportation artery (1) makes more feasible a large-scale accumulation or distribution of bulk commodities, (2) opens up market areas not previously easily accessible, or (3) results in sufficiently lowered freight rates to give competitive advantages over other areas not so benefited. Irrespective of total freight tonnages involved, there is the possibility that the improved Seaway — by favorably changing Chicago's pattern of industrial potentials — may still constitute the impetus to economic growth envisioned by its enthusiasts. Here gain, however, the evidence does not ıstify the claim.

The Seaway will not increase the umber of transportation media availble to the Chicago Area; the route has or more than a generation been part f the city's traffic structure. What he improvement *will* add is an increase n the potential capacity of carriers erving the city via the Seaway. That ncreased capacity will be attributable argely to the increased size and loading f vessels permitted by the deeper hannel, and to the more frequent cheduled sailings now promised. For he first time, the amount of waterorne cargo entering Chicago can reach uch volumes as to make water carriers ffective competitors with overland nedia. Economies inherent in utilizing arger units of low-cost water transporation hold promise for industries reuiring facilities for accumulation of ulk materials or making large unit hipments of products. However, the igh proportion of Chicago's 1965 Seavay movement expected to be made up f small-unit general cargo shipments eaves little room for this aspect of eaway potential to make a significant ontribution to Chicago's industrial otential.

A moderately altered pattern of narket accessibility may be expected o follow Seaway improvement. Ecoıomic accessibility to markets is in part ontingent upon the size of shipments hat can be made, and the deep-draft vaterway will improve at least that spect of Chicago's marketing strucure. Europe, South America, the whole vorld — from that standpoint — can be een as newly and effectively accessible by direct freight shipment from Chicago, but Chicago and the entire Midwest are in turn attractive and newly accessible market areas to foreign producers of competitive products. The Seaway is certainly not a one-way street; not only will world markets become more accessible to Chicago producers but also foreign producers will become more active competitors in the Midwest. The recent pattern of world prices and world trade offers little comfort to those who feel that increased market accessibility is in itself sufficient reason for anticipating added area employment and economic activity. The decreasing competitive advantage of American products in overseas markets and the increasing advantage to foreign manufacturers in Midwestern markets add a note of caution to estimates of the possibilities of expansion of industries in the Chicago Area as a result of the Seaway improvement. The composition of foreign cargo receipts at Chicago during the first few months of improved Seaway operation lends added emphasis to that warning.

It is the third possibility that offers the chief promise of long-range beneficial impact of the improved Seaway on the Chicago Area. There appears in logic and in fact a strong presumption that Seaway improvement — and the new "volume competition" offered to land transportation media by ocean shipping — will result in a freight rate structure differentially favorable to shippers and receivers in the Chicago Area and in other Lakes ports.

The improved transportation-cost structure of Chicago will not necessarily result from a reduction in water-borne freight rates themselves. Rates, including tolls, on the improved St. Lawrence Seaway are at approximately the same level as they were on the former Great Lakes-to-overseas passage. They constitute, however, a base-level rate which in many instances is significantly below the costs of shipping commodities over competing land media. The exigencies of competition will lead to carriers on competing media quoting lower rates to retain their traditional share of traffic volume. The transportation-cost benefit to Chicago, therefore, will come from the reduction of freight rates on higher-cost land transfer media facing effective water-borne tonnage competition for the first time. Seaway carriers, in their turn, may then reduce their rates to maintain traditional differentials between land and water carriers.

Announced and proposed rate changes early in the first full navigation season on the improved St. Lawrence Seaway bear out these logical suppositions. By mid-June, 1959, Eastern railroads had cut their rates on export grain movements between Midwestern points and North Atlantic ports by 20 to 25 percent — a move expressly designed to meet the new competition of the St. Lawrence Seaway. Within the following month and a half, railroads from the Midwest to Gulf Coast ports met these export rates and were considering corresponding reductions on a wide variety of hard goods. Land carriers serving Great Lakes ports — especially the western railroads — have been rather slow in adapting their rates to meet the new competitive situation. There are signs, however, that special export and import freight rates will be offered in the future on shipments to Great Lakes ports. Admittedly, the rate reductions cited reflect primarily increasing competition for the handling of goods destined for direct export and do not affect that vast majority of freight traffic moving in purely internal commerce, but they are indications of a trend toward increasing freight rate competition. A response to this competition from carriers on the Great Lakes themselves is shown by the recent withdrawal of some foreign shipping lines from existing shipping conferences in order to be able to offer more attractive rates.

These planned and announced rate changes point toward a general conclusion on potential *levels* of freight rates, particularly in their relationship to other industrial costs. It seems safe to assume that overland freight rates in areas served by the St. Lawrence Seaway will be reduced relative to rates in other parts of the United States. These reductions will affect certain bulk commodities and, possibly, general cargo goods as well.

Thus, transportation rates on all competing media — water, rail, and truck — will be at a level that will permit certain goods to be accumulated at — and distributed from — Chicago at a lower relative cost than was formerly the case. To the extent that these possibilities for freight rate reductions materialize, to that same extent will the improved St. Lawrence Seaway have made a distinct contribution to the pattern of industrial attractiveness of the Chicago Area. It is undoubtedly within the field of competitive rate osts that the greatest long-range hange in Chicago's existing pattern of ndustrial attractiveness will occur and he greatest impact of Seaway improvement will be felt. These, however, are ndirect rather than direct benefits of Seaway improvement and will be disproportionately large compared with he volume or value of new freight onnages carried on the Seaway. It also eems certain that this indirect impact will be felt only slowly and that much of its effect will not be fully realized until after 1965.

The Seaway and New Chicago Employment

While these important indirect beneits may be seen as beneficial to all acets of Chicago's economy, the direct benefits of Seaway improvement — in ncreased area employment and economic investment — will be more limited and more highly selective. These oo will, in total, be positive.

The Seaway's minor proportional new contribution to the freight traffic flow of Chicago and the limited and mixed consequences of Seaway improvement on the pattern of Chicago's market possibilities suggest that the Seaway can have no more than a limited impact upon Chicago's employment and economic growth. At the same time, that impact must be highly selective. This selectivity makes extremely difficult the quantification of Seaway impact upon the employment and investment structure of Chicago by 1965. Usual classifications of industry — such as the Standard Industrial Classification (SIC) — are made up of activity groups so broad and diversified as to preclude any logical expectation of essential similarity in product, process, or industrial cost pattern. The consequences of changes in costs and market prospects will differentially affect the employment and the growth prospects of specific industry types; they cannot be summarized under usual industrial classifications.

Bearing in mind these provisos of limited, selective impact, the improvement of the St. Lawrence Seaway must be seen to have in total a positive and beneficial effect upon the economy of Chicago. It constitutes a minor but real addition to the totality of transportation media which have given form and character to Chicago's economic pattern. As such it cannot be a neutral factor, and Chicago's entire history of industrial development and economic growth implies that it cannot be a negative one.

As suggested above, the impact of the improved St. Lawrence Seaway upon Chicago's industry is necessarily highly selective. Only some, not all, of the factors of industrial cost as they exist in Chicago will be altered by the opening of the improved Seaway. The Seaway affects the costs of shipping and receiving goods; those industries for which transportation costs are an important part of the total cost structure, therefore, will feel the Seaway's impact to a much greater extent than, for example, industries in which labor costs are particularly important — costs unaffected by Seaway improvement.

A first task in the assessment of the specific industrial impacts of Seaway improvement was to examine the cost patterns of as many industrial types as possible in order to determine those which would be affected by this limited change in the industrial cost structure of the Chicago Area. The cost patterns derived for specific industrial types, in conjunction with a general investigation of the growth trends of major SIC industry groups, enabled us to identify and classify those industries whose prospects for growth, stability, or decline would be affected by Seaway improvement. The following three growth prospect groups emerged from our analysis: (1) industries in which a trend to growth may be accelerated by improved water transportation, (2) industries in which a trend to decline may be arrested by improved water transportation, (3) industries which may decline because of improved water transportation.

By far the larger portion of Chicago Area industries lies outside of these three groups. For some, the Seaway simply is not a factor of importance. For others, already existing patterns of growth or decline cannot be materially affected by the minor industrial cost changes implied by the Seaway. For still others, a favorable or unfavorable impact of Seaway improvement may be offset by other changing cost considerations. It is in the growth prospect groups, however, even if they include a minority of the area's industries, that the impact of the Seaway will be felt.

Industries in which a trend to growth may be accelerated by Seaway improvement. The industries in this group (Table 3) are already well developed in the Chicago Area and have prospects for further expansion irrespective of changes in the area's transportation structure. They are, however, industries in which growth may be further stimulated by the improved transportation of the St. Lawrence Seaway.[3] As can be seen from Table 3, these are primarily industries manufacturing producers' goods — that is, their products will go primarily to other industries rather than to individual consumers. Their markets lie both within the United States and overseas; it seems particularly likely that increased export opportunities will account for at least a part of the stimulus to growth expected from Seaway improvement.

While Chicago has a history of production in all of the industries in this group (except petrochemicals), the relative importance of production here even after the impact of improved Seaway transportation may vary considerably. In some cases Chicago's already great importance may be further enhanced as a result of the increased transportation advantage inherent in Seaway improvement. That same improvement may create a major new center of production for that industry within the Chicago Area. It is equally possible, of course, that the impetus to growth accruing from Seaway improvement will be insufficient to bring about more than modest growth.

Industries in which a trend to decline may be arrested by Seaway improvement. As a result of the continual process of industrial change, certain industries formerly of importance there have been declining within the Chicago

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[3] For the reasoning which led to the assignment of industries to particular "growth prospect groups," see Russell, Fellmann, and Roepke, *op. cit.*

Table 3. Chicago Industries Probably Affected by Seaway Improvement, 1965

dustries in which growth ay be accelerated by away improvement	SIC Number	Industries in which decline may be arrested by Seaway improvement	SIC Number	Industries which may decline because of Seaway improvement	SIC Number
perboard boxes and containers	265	Wood containers	244	Pottery and related products	326
ubber and rubber products	30	Tanning and finishing of leather	311	Paving and roofing materials	295
ructural and heat-resistant clay products	325	Animal fats and oils	2094, 2095	Fabricated wire products	348
rasives	3291	Meat packing	201	Generators and motors	3621
bestos	3292	Special industry machinery	355	Hardware	3429
reated minerals and earths	3295			Cutlery	3421
organic chemicals	281			Hand tools	3423
rganic chemicals (including petrochemicals)	281				
per and paperboard	262, 263				
rtilizer	2871				
onferrous metal rolling and drawing	335				
egetable oils	2091, 2092, 2093				
onstruction, mining, and oil machinery	353				
etal stampings	346				
on and steel forging	3391				
onferrous metal foundries	336				
etalworking machinery	3548				
rroalloys	3313				
od processing industries	206, 2072, 2099				
ip repairing	3731				
condary smelting and refining of nonferrous metals	334				

rea. In most cases, that decline re-ects a change either in raw material ources or in location of the market vhich has taken place as a result of road national trends of resource use, ndustrial development, and population novement. Some of the general trends oward decline may be arrested if Sea-vay improvement reverses the factors vhich were causing the decline of those ndustries within the Chicago Area. In eneral, it has seemed that the indus-ries most likely to be benefited by the mproved water transportation are hose which produce items for sale to ther industries rather than for direct onsumer sale. All of the industries in he present group (see Table 3) except neat packing fall in that category. ven some of the products of the meat-acking industry — and certainly of the ubsidiary leather and animal oils in-ustries — are sold for further process-ng. Because of a general pattern of industrial expansion within the Chicago Area, few industries have shown tendencies toward general decline; of these, only those few listed in Table 3 show promise of benefits from improved Seaway transportation sufficient to reverse their presently expressed trends.

Industries which may decline because of Seaway improvement. The industries in this group (Table 3) are those which seem particularly vulnerable to competition from similar goods brought into Chicago via the improved Seaway. Most of the competition will come from imported goods and these imports, initially at least, will probably come mostly from western Europe. In some of the industries in this group, however, it seems likely that the major competition for Chicago manufacturers will come from other areas of the United States with access to the Seaway.

All of the industries in this group (except paving and roofing materials) are types in which labor cost makes up a high proportion of total industrial cost. Competition for these industries in the Chicago Area is expected to come largely from nonmetropolitan areas in the United States or from foreign districts where labor costs are significantly lower than they are in the Chicago Area. It is possible, of course, that changes in present tariff levels on foreign goods will permit continued stability or even growth of these industries within Chicago.

Manufacturing industries, of course, will not be the only economic activities to feel an impact from the St. Lawrence Seaway improvement. In fact, the nonmanufacturing sector of Chicago's economy holds the greatest promise for employment increments. These increments will come from two sources. First, a very small number of new employees will be required in those activities directly related to the operation of the Seaway itself and to the handling of the vessels entering the Port of Chicago. These new workers — tugboat crews, stevedores, port authority employees, and an inconsequential number of marine insurance workers, freight forwarders, and so forth — will be extremely minor additions to the work force of Chicago made possible by Seaway improvement. A second and larger group of new employment opportunities will be created which are associated with the enlarged operations made possible by the expansion of the Seaway and the port. This group — including construction workers, local transportation workers, public utility employees, and so forth — will find enhanced employment opportunities in servicing the workers of the port area itself and the new industrial workers that it has attracted.

No actual 1965 estimates of employment attributable directly or indirectly to Seaway improvement have yet been offered in this paper; such quantification, of course, is not only extremely difficult but very risky. Seaway improvement, by virtue of the changes it will make in the transportation-cost structure of Chicago industries or in the area's market potentialities, offers not a promise but simply a prospect of change. There is no certainty that managers or investors will see those prospects in the same light as geographers or economists.

Nevertheless, even if all the opportunities for employment expansion now predictable were seen and seized upon, less than 40,000 new workers would be added to the 1965 labor force of the Chicago Standard Metropolitan Area. These workers would be very unevenly divided among the different industry groups (Table 4). Of the estimated possible total of 38,000 new jobs, less than 8,000 would be in manufacturing; the remainder would be in nonmanufacturing activities. No activity group in the broad classification scheme shown in Table 4 would, we anticipate, undergo a decline in employment by 1965 as a result of Seaway improvement. The industry categories listed there are so generalized and made up of such a diversity of individual activities that negative impacts of Seaway improvement would not, we feel, be able 4. Impact of Waterway Improvement on Employment in Chicago Standard Metropolitan Area by 1965

Activity group	Predicted Waterway employment increment
anufacturing	
Foods	1,500
Textiles	. . . . .[a]
Apparel	. . . . .[a]
Wood products	. . . . .[a]
Furniture	. . . . .[a]
Paper	750
Printing	. . . . .[a]
Chemicals	1,250
Petroleum	. . . . .[a]
Rubber	. . . . .[a]
Leather	500
Stone, clay, glass	1,250
Primary metals	2,500
Fabricated metals	. . . . .[a]
Nonelectrical machinery	250
Electrical machinery	. . . . .[a]
Transportation equipment	. . . . .[a]
Instruments	. . . . .[a]
Miscellaneous	. . . . .[a]
onmanufacturing	
Mining	. . . . .[a]
Construction	3,500
Railroad and bus	1,000
Other transportation	3,500
Public utilities (including communication)	1,000
Wholesale trade	3,750
Retail trade	5,000
Finance, insurance, real estate	3,000
Service and miscellaneous	5,250
Government	4,000
Total	38,000

[a] No increment in employment is expected.

xpressed in absolute employment de-lines by that date.

There is no intent here to depreciate he addition of 38,000 new workers to he Chicago Standard Metropolitan rea. In terms of total population, his means the improved Seaway has a otentiality of supporting by 1965 the quivalent of a new city of more than 00,000 population within the Chicago Area. Nevertheless, the employment growth which seems likely or possible by 1965 and attributable to Seaway improvement alone is, obviously, significantly lower than earlier enthusiastic predictions would have suggested. There is always the likelihood, of course, that at a date more distant in the future than 1965 the cumulative benefits accruing from Seaway improvement will be reflected in a further substantial increase in Chicago Area employment. At the present time, however, there exists no background of experience about Seaway traffic flow or industry response to Seaway improvement upon which to base longer-run predictions; beyond the next six or seven years, analysis ceases and guesses begin.

Perhaps the meaning of Seaway improvement on the economic structure of the Chicago Area can best be seen in relative — rather than in absolute — terms. The Chicago Metropolitan Area — as a complex, diversified, and dynamic industrial concentration — has inherent within it patterns of growth and change which by 1965 will have employment consequences far in excess of those reasonably attributable to Seaway improvement alone. Trends in employment volumes since 1947 and recently developing patterns of investment in manufacturing and nonmanufacturing industries suggest that by 1965 employment within the Chicago Metropolitan Area — without any reference whatsoever to Seaway improvement — will have increased by some 270,000 workers. Against that background of anticipated "normal" employment growth, Seaway improvement can provide but a minor relative increase.

Conclusion

The improvement of the St. Lawrence Seaway enhances greatly the significance of a long-existing minor transportation medium serving the Chicago Metropolitan Area. Seaway improvement will permit a substantial increase in the water-borne overseas commerce entering the Chicago Area. For certain industries, it will provide a substantially altered pattern of industrial costs and market possibilities. If its full potentialities are realized and acted upon, it will make possible a small but significant increase in the total volume of manufacturing and nonmanufacturing employment within the Metropolitan Area. Only the most enthusiastic proponent of Seaway improvement could claim for it a major role in the industrial structure or employment pattern of the Chicago Area by 1965. The number of jobs that Seaway improvement can create and the significance of the new St. Lawrence Seaway within the total freight traffic structure of the Chicago Area are too minor to permit this single development to alter materially the existing course of Chicago's economic development.

The Life Cycle of an Industry: The Electric Interurban Railway*

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HE ELECTRIC interurban railway, al-ough making important contributions the improvement of short-distance obility of the population in the era f transition from primary reliance pon the steam railroad and horse-rawn vehicles to dominance of the otor vehicle, experienced one of the ortest life spans and most unsatis-ctory financial records of any major dustry. The typical interurban line mained in operation only 29 years, nd a large portion of the original capital investment, over $1 billion in 16,100 miles of line, was never recovered. Only a few of the some 325 companies in the industry ever earned a reasonably adequate return on investment for any length of time, and many never did so.

The Industry

The interurban was an intercity electric railroad designed primarily for the transport of passengers. The lines of demarcation between the interurban industry and related forms of transport are relatively well defined, although there were of course some borderline cases. The interurban differed from suburban and rural street railway lines by virtue of the use of heavier, higher-speed equipment and greater extent of private right of way, although particularly in New England, Pennsylvania, and New Jersey these two forms of transport shaded into each other. At the other extreme, the interurban differed from the railroad by virtue of the exclusive use of electric power, by the passenger cars having their own motors rather than being drawn by locomotives, by lighter equipment and track, and by frequent operation on the streets within cities and towns. The closest relative of the interurban was suburban electrified railroad service, but the latter operated within the confines of a metropolitan area, made greater use of multiple-car operation, and possessed high-speed entrances to downtown areas, which few interurbans enjoyed.

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* This article summarizes portions of an tensive historical study of the interurban ectric railway industry undertaken by the thor in conjunction with Professor George ilton of Stanford University, with the aid a grant from the University of Illinois esearch Board. In March of 1960, Stan-rd University Press will publish a volume titled *The Electric Interurban Railway in merica,* by George W. Hilton and John F. ue, based upon this study.

The author is indebted not only to his llaborator in the general study, Professor ilton, but also to a large number of other ersons who assisted in the gathering of aterial, and particularly to Dr. Thomas onway, Jr., who was associated with the terurban industry for nearly fifty years, and r. George Krambles, of the Chicago ransit Authority, for their comments and ssistance.

Development of the Industry

Technologically, the interurban was an offspring of the electric street railway, which was perfected to a degree permitting successful commercial use in the last half of the decade of the eighties, the culmination of sporadic experiments dating back to 1830 and the more intensive work of Edison, Daft, Van Depoele, Siemens, and others in the early eighties. The most important innovator, in the Schumpeterian sense, was Frank Sprague, whose completion of the Richmond, Virginia, system in 1888 marked the first extensive operation, although several lines had been placed in service in Montgomery and other smaller cities as early as 1885. In the succeeding fifteen years the electric car revolutionized urban transport, almost completely replacing horse and cable cars and extending service into new areas. Likewise, rapid transit facilities were electrified and rapidly expanded.

Extension of the use of electric cars into the field of intercity transportation followed inevitably. In many areas of the country steam railroad service was infrequent and inconvenient for much short-haul travel, horse-drawn vehicles were slow, and the motor vehicle was in the most rudimentary stage of development. On December 28, 1889, an electric car made the nine-mile run from Newark to Granville, Ohio, to inaugurate the development of a widespread interurban network concentrated in the Midwest. Even before this a few intercity routes had been built, including one from St. Catherines to Thorold, Ontario, in 1887, but these were extensions of streetcar routes, the Newark line being the first built solely as an intercity route.[1] Despite this early start, however, progress came very slowly and in widely scattered areas.

After 1895, the annual rate of construction increased to about 200 miles per year, and by 1900, 1,400 miles were in operation, about 9 percent of the ultimate total. With the turn of the century came a tremendous expansion, which reached an initial peak of 1,470 miles completed in 1902. The panic of 1903 dried up the money capital supply and mileage built fell by half the following year; but revival came quickly, and the second great boom brought the completion of 1,638 miles in 1907, the all-time high. The panic of that year again cut construction figures in half, and the annual rate of building stabilized around 500 miles a year until 1915, after which construction came rapidly to an end.

Chart 1 presents the series of miles of new line completed, new car orders, and rate of return on reported invest-

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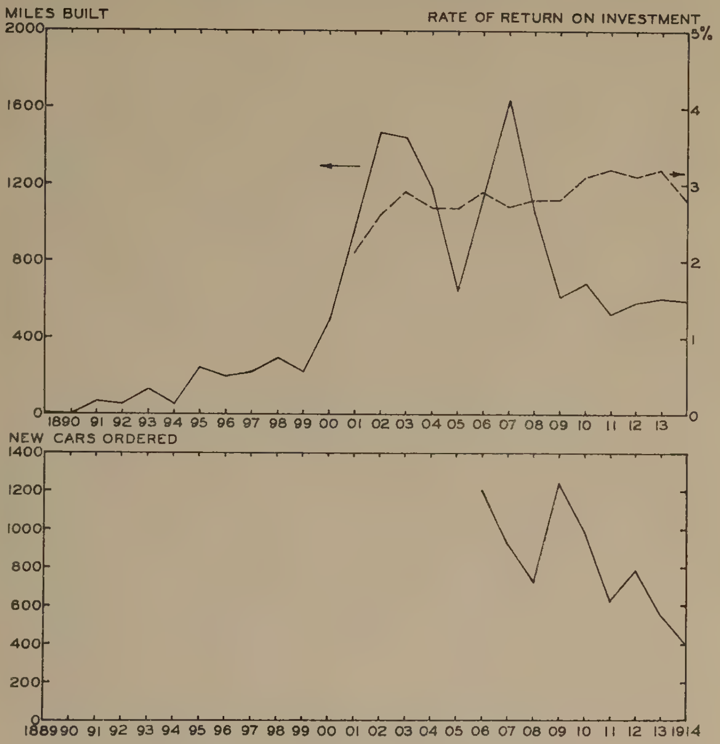
[1] The term "interurban" was first used in the early nineties in reference to the streetcar lines between St. Paul and Minneapolis, and from Cedar Rapids to Marion, Iowa. The word was popularized and given a more specialized meaning by Charles L. Henry, Anderson, Indiana, lawyer, who initiated the Union Traction system.

Chart. 1. Miles of New Line Completed, Rate of Return on Investment, and New Cars Ordered, Electric Interurban Railway Industry, 1889-1914



ent for the period from 1889 to 1915.
he rate of return figure was calculated
r a large sample including 40 per-
ent of the firms in the industry, oper-
ting 50 percent of the mileage, for
ears at five-year intervals, with figures
btained for the intervening years from
smaller sample of typical companies
hose earnings records closely followed
he pattern of the large sample for the
elected years. The sample used for the
ears prior to 1906 was somewhat in-
dequate because of lack of data. It
as necessary to calculate the rate of
eturn on reported capital investment,
hich clearly contained some elements of water, a feature which lessens the significance of the absolute figures but does not seriously interfere with the measurement of trends.

Several features shown by this data are significant. One was the very slow development for a decade; less track was built in the eleven years following the construction of the first line than in 1902 alone. This phenomenon was in part a result of technological inadequacies, but primarily it reflected the general skepticism of potential promoters and suppliers of money capital about a relatively novel type of business activity.

A second feature was the extremely sharp jump in construction once the industry "caught on." The expansion reached almost "mania" proportions in the period between 1901 and 1907, in the sense that a fantastic number of projects were planned and charters obtained for lines which could not possibly have earned a profit. Even with the sharp rise in building, only a small fraction of the projected mileage was ever built. The most surprising feature was the occurrence of this great boom in the light of relatively mediocre earnings. As shown in Chart 1, the rate of return in this industry during this period ranged between 2.1 and 3.2 percent, compared, for example, with a return of about 5 percent in the railroad industry, and far higher figures in many other fields. These figures understate somewhat the return on actual investment cost because of the water elements in the capital structure. But even if the most liberal adjustments are made for this water, the return was not adequate to justify the expansion which occurred. The rapid expansion under such circumstances can be explained by three considerations. First, a few companies had done reasonably well, and promoters of new enterprises looked to these as models of their own potential success. Secondly, some lines were promoted by syndicates which invested little of their own money but benefited from promotion and construction. Thirdly, the willingness to invest was based upon expectations of great earnings in the future; it was widely recognized that existing earnings were inadequate, but growth of population and economic activity were regarded as certain to bring high earnings in the future. This attitude of optimism was contagious and led to a boom completely unjustified by actual conditions prevailing.

A third feature was the commencement of the decline in construction before the rate of return on investment showed any indications of falling off. The declines immediately after 1903 and 1907 were simply the products of the financial panics of those years, which made money capital difficult to obtain and caused financial difficulties for several of the large syndicates which were carrying on a substantial portion of the building. But the failure of construction to return to its previous levels after 1907 must be explained in terms of other forces. One, of course, was the fact that many of the best lines had already been built, and many new projects would have offered less traffic potential, either because they would have served less promising territory or because they would have duplicated existing lines. The primary factor, however, was the recognition by investors that the expected improvements in earnings had not occurred, although the trend had been upward to a limited extent. Many roads were experiencing an increase in business but little improvement in net, partly because of declining steam railroad fares and partly because of rising expenses. The experience in general provides a good example of the rule that an industry may expand rapidly on relatively mediocre earnings so long as there is widespread acceptance of the expectation of improvements in earnings, but that this expansion will slow down nce these expectations are not realized fter a few years.

The pattern of new car orders was omewhat similar to that of miles of ew construction, since many of the ars were required to permit operation f the new lines; but car orders experinced a peak in 1909 and 1910, years n which construction had already allen sharply from the 1907 level, a henomenon explainable only in terms f the extensive orders in this period o replace early and now-outmoded quipment. Between 1910 and 1915, n the other hand, new car purchases ell by two-thirds even though annual onstruction mileage was stabilized. In rge measure this is explained by the act that the orders for new cars were laced well in advance of the date of e completion of the lines, and thus as ew construction plans slackened prior o 1915, car orders fell accordingly. he interval between the making of a ecision to build a new line by the ompany and the placing of it in operaion was at least two years on the verage, and often much longer.

Structure of the Industry

Like most public utilities, the interrban was characterized by almost omplete absence of intra-industry cometition. Competing lines were very are, largely because of the obvious nadequacy of potential traffic volume o support more than one line. In a umber of instances duplicating lines vere projected and some would have een built had the industry been more rofitable over a longer period. In ome states regulatory policies checked uplication, but most lines were built before the commissions exercised effective control over construction. The one horrible example of two companies building parallel lines at the same time in the face of limited traffic occurred between Dayton and Xenia, Ohio, in 1899. One company soon gained control of the other and abandoned the latter's line at an early date. In a few other instances a newcomer with a better line drove an older road out of business.

While most interurbans enjoyed a monopoly position within the industry, they were subject to severe competition from other industries. Many of them paralleled railroads, but were often able to take much of the latters' short-haul passenger business, despite retaliatory rate cuts, through greater frequency of trains and stops, and more convenient locations. On the longer runs, competition with the steam roads was more difficult because of inferior comfort and speed. The interurbans were also able to take some railroad freight business because of greater speed, but they could not touch the bulk of this business, partially because of the lack of adequate long-distance connections and sidings to industrial plants.

The attitude of the railroads to the interurbans varied. In the Midwest, except for a few medium-sized roads such as the Chicago Great Western, they were extremely uncooperative, refusing to interchange freight cars or establish joint rates, except as compelled by regulatory authorities, and often seeking to block the crossing of their tracks by interurbans. In the Far West, however, the attitude was much less hostile, and the interurbans soon became freight feeders for the main lines and in many instances passed under their control.

In later years the interurban became subject to the severe competition of private automobiles and in some instances of buses; states differed in their policies in permitting bus competition, and a number of bus lines were started before the state commissions gained effective control over them. The relative advantages of the automobile and the bus over the interurban increased as time went on.

The internal structure of the industry was characterized by the relative absence of financial concentration (apart from holding company control to be discussed later), with about 325 companies (not all of which were in operation in any one year) during the peak period, with an average mileage figure of 49 and a median figure of 26. The Pacific Electric, which operated in the Los Angeles area, was by far the largest, with 717 miles of line; and two other systems, the Ohio Electric Railway and the Indiana Railroad, operated more than 500 miles under common management for a relatively few years. Only 10 companies operated over 200 miles, whereas 140, nearly half the total, operated less than 25 miles and only 13 percent of the total mileage. There were relatively few economies to be gained from end-to-end consolidations, largely because of the short-distance nature of much of the traffic. Classification by assets and by gross receipts gives a similar picture of lack of concentration. In 1914, for example, with a sample of roughly half the companies, only two had assets in excess of $100 million, whereas over half the sample firms had assets between $1 million and $5 million, and 15 percent had assets under $1 million. One company (Pacific Electric) had receipts for that year in excess of $5 million, and the median for the industry was between $250,000 and $500,000. Of all the firms 20 percent had gross receipts under $100,000 a year. There was little tendency toward consolidation as time passed, except in the very early years and except for the formation of two substantial systems after 1930 (the Cincinnati and Lake Erie and the Indiana Railroad), designed to improve long-distance service in an effort to check destruction.

Promotion and Control

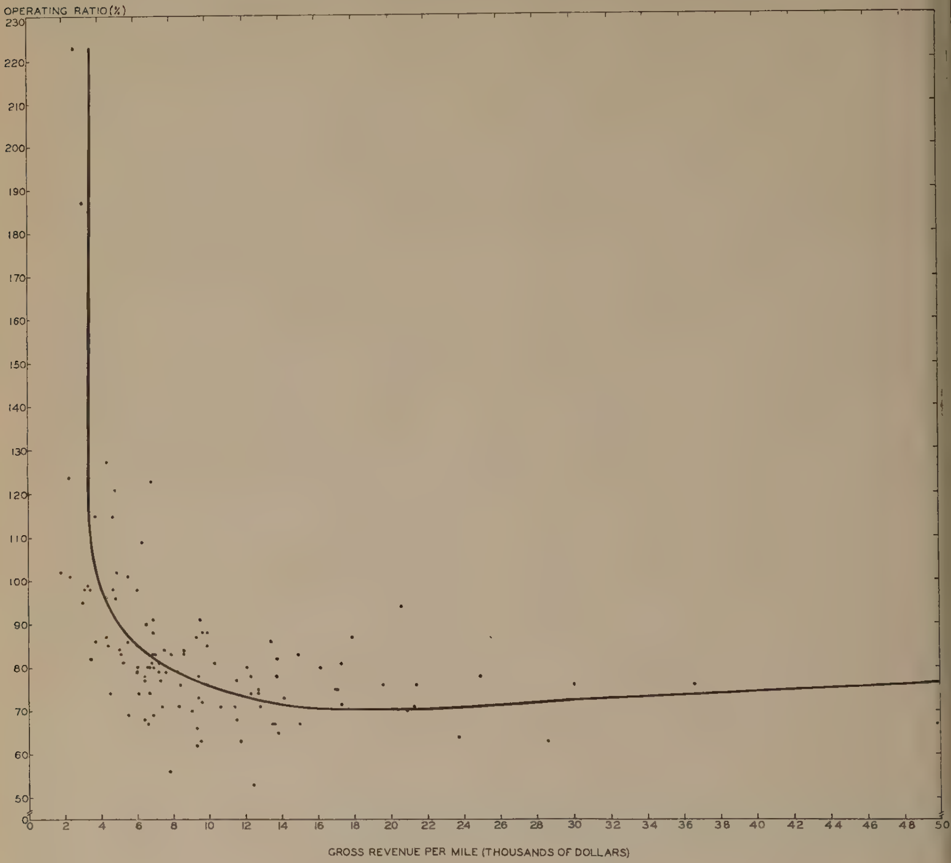
Most interurban projects were initiated either by local business groups in the area served or by large syndicates formed by outside promoters. In the former case, a charter would be obtained by a group of local investors, typically businessmen; financial aid was often sought from municipalities or civic groups; bonds were sold locally or in large financial centers; and construction was undertaken. The syndicates, on the other hand, would select (on the basis of only the most fragmentary data of potential traffic) what they regarded as routes offering the best possibilities; finance the roads largely by sale of bonds with little investment on their own part; and contract for construction, often with an affiliated company which they owned.

More than half of the interurban companies, operating about 40 percent of the mileage, remained independent nterprises throughout their lives. Some f these sold electric power or operated a few streetcars in the larger towns erved, but primarily they were exclu- vely interurban enterprises. In addi- ion, about 8 percent of the total mile- ge was operated in conjunction with rger-city independent street railway stems, either through affiliated com- anies or directly by the street railway rm. About one-fourth of all inter- rban enterprises were affiliated with ectric power companies, either be- ause the enterprises had developed ogether or one had purchased control f the other. In some parts of the ountry the electric power and inter- rban industries developed simultane- usly; electricity was generated jointly or the railway and for sale to the ublic and service was extended to owns and farms along the line, with he same poles carrying trolley wires nd electric transmission lines. This ntegration continued throughout the fe of some of the enterprises, with the ower business — originally often inci- ental — coming to overshadow the nterurban operations. Virtually all of hese power company affiliates, plus everal affiliated with street railway ompanies (and in some cases inte- rated street railway, interurban, and lectric power enterprises, such as the Milwaukee Electric Railway and Light Company) and a number of nonaffili- ated companies (with about 12 per- ent of total mileage) passed into the ands of the various holding company ystems, which came to dominate the lectric power industry by the 1920's. Few interurbans outlasted the holding ompanies; when the latter were broken up following federal legislation in the thirties, the few remaining companies under their control regained independent status.

The final group of companies, with about 15 percent of the mileage, became, sooner or later, subsidiaries of main-line railroads. In the East, railroad acquisition came at an early date, with the primary goal of coordinated rail-interurban passenger service. The New Haven Railroad spent large sums of money (and bankrupted itself) acquiring New England trolley lines for this purpose, and the Delaware and Hudson and the New York Central did so to a lesser extent. Almost none of the Ohio Valley, Illinois, or Iowa systems became subject to rail control, but on the Pacific Coast a large portion of the interurban network eventually passed into the hands of the steam roads, which were interested in the electric lines primarily as freight feeders. The Hill lines and the Western Pacific acquired important interurbans, and Southern Pacific owned the extensive Pacific Electric system.

Most companies were financed heavily by the issuance of bonds. In 1914, about 45 percent of the capitalization was represented by bonds and 55 percent by stock, but in fact the high degree of watering of the stock meant that well over half of the funds actually came from bonds. Few of the companies were able to earn bond interest consistently, and as a consequence bankruptcies were frequent. Many of the enterprises went through at least three reorganizations, and some even more; the only ones to escape were those supported by railroads or other

Chart 2. Relationship of Gross Revenue Per Mile and Operating Ratio, 119 Interurban Railway Companies, 1920



owners, or profitable lines abandoned before losses became severe. Even in good years such as 1902 and 1909, interest consumed more than 80 percent of the operating profits after taxes, leaving extremely little for either reinvestment or dividends. This condition was an inherent source of weakness, preventing improvement and modernization via retention of earnings.

Operating Costs and Traffic Volume

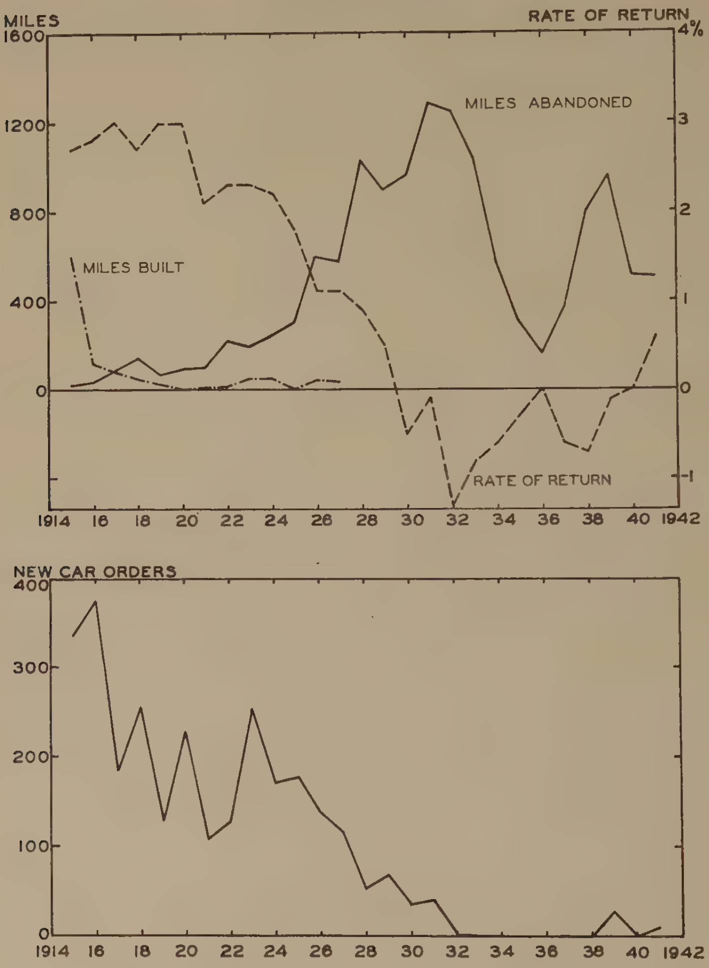
The relationship between traffic volume and cost per passenger-mile would indicate the general nature of the cost curves of the firms in the industry, although separation of short-run and long-run influences is virtually impossible. Data were compiled for three years, 1914, 1920, and 1924, covering about one-half of the firms in the industry (and about half the mileage). These data did not permit direct comparison of volume and cost, since costs per passenger-mile were not available. However, since fares per mile and bor, power, and other costs were rela- vely uniform, the operating ratio ratio of operating expenses to operat- g revenues) gave a reasonably satis- ctory substitute, so far as costs other an interest and return on owners' pital were concerned. That is, a firm ith a high operating ratio had a rela- vely high cost per passenger-mile — ven the fare level. For all three of e years studied, a definite pattern was own, as illustrated in Chart 2 for 920. Over a substantial range of gross venue per mile, greater revenue was pically accompanied by a lower op- ating ratio. Likewise, with revenue elow a certain figure per mile (about 1,500 in 1914 and $3,000 in 1920 nd 1924), it was impossible for most ads to cover their operating expenses, t alone earn a return on investment. n the other hand, at the top of the olume scale greater revenue was not ccompanied by lower operating ratios, nd there was at least some tendency r the ratios to rise slightly. In other ords, definite limits to the economies f plant utilization and of scale were eached, and diseconomies possibly were ncountered. Study of the companies volved suggests that the difficulty was ot a matter of temporary overutiliza- ion of plant, but of certain character- stics of this class of firm, which con- isted of the lines operating into large etropolitan areas. These character- stics particularly had to do with higher vage rates and serious peak load prob- ems. The diagram shows substantial catter, in part because of variations in ares, average length of trip, wage, ower, and materials costs, and other lements for which adjustments cannot be made. Despite the limitations of the data, the conclusions suggest confirmation of the belief that average cost curves tend to be ◡ or at least ◡ shaped.

Decline of the Industry

The Initial Period

The industry never enjoyed a period of stable prosperity, the decline commencing almost as soon as the expansion ceased. Chart 3 carries the series introduced in Chart 1 down through the years of decline and collapse. The year 1915 was in a sense the turning point, as construction fell sharply, never again to exceed 125 miles in a year. Only about 500 miles were built after 1915, about the same as the 1915 figure alone. Intensification of the forces which had slowed down construction after 1907 occurred. Not only was there no improvement in the rate of return, but there was some downturn in the period from 1914 through 1916, and in 1918. However, there was no significant general decline for the industry as a whole prior to 1921; construction almost ceased even though the rate of profit was nearly as good as in the peak years. It was now crystal clear that no improvement was likely to occur, and to some at least there was fear of further deterioration, primarily because of the development of the automobile. Between 1910 and 1915 car registrations increased fivefold, and the motor vehicle had ceased to be a rich man's toy, although not for another decade was it to become a household "necessity." Already some companies had experienced loss in business to the automobile, and the widespread extension

Chart 3. Mileage Built and Abandoned, Rate of Return, and New Car Orders, Electric Interurban Railway Industry, 1915-42



of the jitney in 1914, although confined to urban areas, indicated the potential threat. While the industry did not foresee the real significance of the motor vehicle, the development of the latter put an end to expectations of great improvements in earnings. The rate of return held up during the pre-1920 period, but one indicator that all was not well in the industry was the continuous increase in the operating ratio, the average rising from around 59 prior to 1909 to 67 in 1915 and 79 in 1920. Thus the ratio of profit to revenue fel sharply, the percentage return of capital investment remaining much the same only because the dollar volume o revenue (and expenses) rose sharply with the absolute gap between, as well s the investment figures, remaining argely unchanged.

In light of these factors, it is surprisng that any new lines were built at all, particularly after 1918. As a matter of fact most of these last lines were located in rapidly growing areas in the Far West and Southwest, and were planned as carload freight handlers from the beginning, a type of traffic hen not yet affected by the motor vehicle. With a few exceptions these last projects were complete failures.

As would be expected, the end of building brought new car orders to a relatively low level, but replacement demand stabilized at figures between 00 and 250 cars per year for the entire period through 1927. As an industry of this type reaches maturity, construction of new fixed investment in real property comes to an end long before purchase of new equipment for replacement purposes. The new cars were acquired in part to reduce costs, in part to allow higher speed.

The abrupt end to construction left the industry in a somewhat unfinished condition, with many lines falling far short of intended destinations and the pattern of lines showing substantial irrationality. In general, most lines offering the best potentialities were completed, but a number of roads which were built offered much less chance of success than ones projected which never were built.

The Collapse

After 1920 the growth of automobile use and in some instances of bus service caused a rapid deterioration in the gross revenues and profit position of many lines. Although substantial reductions were made in expenses, it was impossible to maintain the profit level, and in part the cost reductions were temporary, reflecting deferring of track and equipment maintenance. The rate of return dropped from 1920 to 1921, stabilized around 2 percent until 1925, and then fell drastically, to 1.1 percent in 1926 and 0.5 percent in 1929, the last year of prosperity for the economy, and a −1.3 percent in 1931. These over-all figures (based upon the sample noted previously) obscure the even more rapid deterioration of the situation of the smaller firms, harder hit in this period than the larger ones. In the sample covering nearly half of the firms in the industry, 2 percent showed operating deficits in 1914, 18 percent in 1920, 25 percent in 1924, and 50 percent in 1929, even though by that year most of the weakest companies had been liquidated. In 1929 only 10 percent of the firms had earnings in excess of 3 percent, and many of these were ones which had lost most of their "interurban" characteristics, becoming primarily carload freight feeders for main line railroads.

Construction came to a complete end in 1926 and 1927 with the completion of the Houston North Shore and the Chicago North Shore and Milwaukee's high-speed Skokie Valley cutoff.[2] New car orders, limited to a very few roads which were trying to survive by modernization, continued at a reduced level through 1931, fell to 2 in 1932, and then ended. After that year only 28 new cars were ever ordered, most of them for suburban service out of Chicago.

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[2] In 1939 the Sacramento Northern extended service over the San Francisco Bay Bridge, only to abandon it two years later. In 1956 the Chicago South Shore and South Bend completed a cutoff line around East Chicago to replace street running. Some mileage was built after 1927 for freight service only, but this is not essentially interurban operation.

Prior to 1914 only 54 miles had ever been abandoned, largely duplicating trackage or completely ill-conceived ventures. Late in December of 1914, the Cleveland and Eastern abandoned its line to Garrettsville, and this marked the beginning of a trend which was to decimate the industry. The decline began slowly with an accumulated total of only 388 miles abandoned by 1920. The trend gained momentum in the early twenties as more companies experienced deficits, and the general rate of return stabilized around 2 percent. This was far less than an average return on investment, particularly since price increases had raised reproduction cost well above the original levels and thus squeezed out much of the water in the reported figures of investment. The typical company continued to operate, since this return was preferable to that obtainable on salvage value. Abandonments were almost entirely of poor roads no longer able to cover operating expenses.

When the rate of return dropped sharply in 1926, the abandonment figures rose accordingly, the total reaching 600 miles in that year and 1,000 miles in 1928. By 1927 no longer were the weak roads alone affected; several larger systems, including much of the Michigan network, went out in the late twenties. By the beginning of the depression about one-fifth of the original mileage was gone, and many companies were barely able to hold on.

The depression, of course, struck the final blow on the already weakened industry. Few roads escaped deficits, and over 5,000 miles — nearly one-third of the total — were abandoned in the period 1930-34. With recovery some roads held on despite operating deficits in the hope that prosperity would restore their profit position; but when the rate of return fell sharply again in 1936, most remaining firms gave up hope and abandonment figures rose to a new peak of 958 miles in 1939. A sizable portion of this late-thirties abandonment involved elimination of passenger service only; these cases are treated as abandonments, since the ending of passenger operations destroyed the interurban characteristics, the line merely becoming a railroad in the usual sense of the term. At the outbreak of World War II there remained in passenger service about 2,600 miles of line out of the original 16,100, but this consisted primarily of high-speed suburban service out of Chicago and other cities, and of lines gaining most of their revenue from carload freight service rather than typical interurban operations.

In the postwar period, one by one the remaining lines were abandoned or discontinued passenger service, culminating in a figure of 393 miles in 1955, more than half of the mileage existing at the beginning of the year. On January 1, 1960, only three roads, with 209 miles of line, continued in passenger service, and one had received approval of its abandonment application. Of the original mileage, about 2,000 iles, or 14 percent of the total, has een continued in operation for freight rvice. Most of this is located in the acific Coast states, Iowa, and Illinois, lus the Piedmont and Northern in the arolinas, largely owned by main line ailroads and operated now primarily y diesel power for freight feeder serv- e. These lines had been able to build p carload freight service, whereas the pical interurban in the remainder of e country, especially in Indiana and hio, had not.

ailure to Recognize the Secular ecline

A study of attitudes of corporate fficials during the years of the decline, s manifested in company reports, atements at conventions, and papers trade journals, shows a continuing ailure to recognize the ultimate signifi- ance of the downward trend of the ndustry and a constantly recurring be- ef that the industry had stabilized, so hat the better lines could continue to perate indefinitely. As noted previ- usly, the years prior to 1910 were haracterized by general optimism bout the future, largely unsupported y current earnings, but which spread y contagion to the point of reaching ubble proportions. Only the prob- ems of raising money capital prevented he building of several times as many ines as were completed; capital ra- ioning was highly, although not ade- uately, effective.

After 1910, the attitude toward the uture underwent considerable change s earnings did not, on the whole, im- rove and it became increasingly ap- arent to investors that existing returns were inadequate, although there was no anticipation at all of the significance of the motor vehicle. Although new construction dropped sharply, nevertheless in the face of the inadequate earnings picture a considerable mileage of new lines was built and many others were projected, held back only by lack of funds. The growth of the motor vehicle was so great between 1910 and 1915 that its consequences could not be overlooked entirely by the latter year, especially when some interurban companies were losing business. As a consequence, new construction did come almost to an end. Even as late as the early twenties, there was complete failure to foresee the magnitude of the future growth of the automobile and the ultimate doom of the interurban. The larger companies were convinced that they could survive provided that they modernized, and many spent considerable sums for this purpose and would have spent far more could they have obtained it. By the late twenties the situation was so desperate that optimism had largely disappeared, but even in this period the Insull interests spent considerable sums in acquiring and modernizing the Indiana lines, united as the Indiana Railroad. Even in the postwar period one of the few remaining companies, Illinois Terminal, acquired new cars in the belief that passenger service would continue indefinitely, only to abandon all of it a few years later.

There were several reasons why the companies failed to see their eventual destruction. One was the inherent problem of discerning a trend while it is under way and having the constant tendency to believe that a new level of stability has been reached, with adjustments to new forms of transport completed. Closely related was the inability of firms to see the extent of motor vehicle development, with the tendency to project the motor vehicle and the highway of the existing period into the future without change. So long as the automobile was as crude as it was prior to the twenties and the road network as inadequate, the interurban actually had little to fear. What the industry could not foresee was the rapid improvement in cars and the extremely rapid growth of the highway systems. This failure in part was attributable to the slow development of the motor vehicle between 1890 and 1915; although nearly as old as the interurban itself, it had developed much more slowly and it was hard for the electric railway industry to realize its potentialities. The thinking of the interurban industry was also clouded by the "auto is a fad" doctrine, the notion that people would soon tire of riding in cars once they became commonplace and would return to the interurban. Beyond these considerations was the obviously psychological block in the way of admitting the failure of the industry with which a person is intimately connected, the human tendency to think that things cannot get worse, that changes to improve the situation will occur, that the person's own company is in a better position to survive than the others which were failing.

Reactions to the Decline

Various interurban companies reacted differently to the decline of the industry. Some did nothing, continuing to operate in the same fashion until losses made abandonment desirable. More than one company made its last run with the same car (and sometimes the same motorman) that had made the first one 25 years before. Some companies attempted to adapt to changing conditions. One common policy was that of developing freight traffic, largely neglected in the earlier days of the industry. The roads had some success with this policy, and freight revenues of many lines continued to rise long after passenger traffic had begun to fall; but there were many obstacles, physical and otherwise, and eventually the truck commenced to take most of the traffic of the typical Midwest line.

Other roads sought to modernize passenger service by adopting lightweight high-speed equipment, often operated by one man. The most successful was the Cincinnati and Lake Erie, a consolidation of several Ohio roads, under the management of Dr. Thomas Conway, Jr., but even this road could not buck the secular trend for long. A few others sought to build high-speed entrances into downtown areas. Most roads, however, lacked funds for any sort of improvement.

Finally, some companies turned to bus operation, at first usually to keep out independent bus operators, but ultimately to replace rail runs or entire operations. Few of the companies, however, continued in the bus field, usually selling out to Greyhound or other large systems, partly because of the limited profitability of small-scale intercity bus operation. For the most rt the interurban companies were mply liquidated, the salvage value elding the bondholders only a small ortion of the original investment. In me instances such money capital as ight have been withdrawn was con- med by operating deficits in the last ars of operation.[3]

auses of the Collapse

The decline and collapse of the in- stry was the product of several forces, e of which has considerable import r other lines of economic activity. he most obvious factor, of course, was e rise of the motor vehicle. For the pical short-distance trip which consti- ted the great bulk of interurban avel, the automobile was more con- enient for many persons, once cars ad been perfected and roads were ade- ate. In many instances the volume travel remaining once car usage be- me widespread was inadequate to al- w the provision of any sort of pas- nger service, at least on frequent tervals. The companies tended to duce service as business fell, thus wering traffic still more by reducing nvenience. In some instances the terurbans were subject to extensive us competition, which diluted the re- aining business. Many of the early nes abandoned were those suffering us competition, while some which sur- ived till later years were protected om it by state regulatory authorities. he presence or absence of bus competition was of no significance, however, from the standpoint of long-range survival of interurban passenger operations.

Important as the motor vehicle may have been for the destruction of the industry, careful examination reveals that it was by no means the only force. Some of the last lines in passenger operation carried a traffic volume far greater than that of the typical road of the peak years of the industry, since their business was protected by traffic congestion and parking problems in metropolitan areas. These last lines were primarily roads providing high-speed service from large cities to suburban areas and nearby cities. Yet despite their traffic volume they reached the point at which they could not even cover direct operating expenses. The explanation is to be found in the "productivity squeeze" to which any industry, but especially those in the service fields, is subject if output per worker remains constant in a period in which industrial productivity per man is increasingly rapidly. By the nature of interurban operations it was difficult to reduce manpower requirements per passenger-mile of traffic, primarily because of the technical nature of the operations and partly because of labor union policy. As traffic declined, it was even difficult to maintain existing productivity per man.[4] As a consequence, the relative cost of producing interurban service rose continuously compared with that of producing most manufactured goods, since major technological changes were occurring in the latter industries. Hourly wage rates in the interurban industry were roughly ten times as high in 1957 as in 1912, yet the general price level had increased only two and a half times. With interurban productivity largely unchanged, the fares would have had to rise four times as much as the general price level, at a given traffic volume (assuming that other costs reflected similar wage increases in other fields). Such an increase would have been completely self-defeating by destroying most of the traffic. In practice the 1957 fares, per mile, were barely twice as high as those in 1912. The problem would have been serious even without motor vehicle competition; the combination of the two forces was fatal.

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[3] See J. F. Due, "An Empirical Study of bandonment Decisions," *Journal of Fi- ance*, Vol. XIV (September, 1959), pp. 1-72.

[4] The Barger study for the National Bureau of Economic Research showed a steady decline in output per worker in the interurban industry from 118 (1929 = 100) in 1902 to 104 in 1922, 92 in 1931, and 78 in 1938. See H. Barger, *The Transportation Industries, 1889-1946* (New York: National Bureau of Economic Research, 1951), p. 120.

The productivity squeeze which helped destroy the interurbans has been a major and largely unrecognized factor affecting main-line railroad passenger service. Productivity increases have been largely impossible, and thus at maximum-profit or minimum-loss fares the volume of passenger traffic necessary to allow the covering of costs on a particular train has risen steadily. Many trains discontinued in recent years have had far greater traffic volume than thousands which were operated, presumably at least covering direct costs, fifty years ago. This phenomenon is particularly noticeable in the field of commuter service, in which losses have continued to rise despite stability or even growth of traffic. Wages rise to a degree comparable with the changes in other industries, and since fares cannot be raised sharply without serious loss in business, the service becomes progressively more unprofitable. Both commuter and main-line service can be preserved for a substantial period (short of subsidies) only by improved productivity per employee. Unlike most interurbans[5] the railroads have some potential leeway if restrictive forces can be overcome; in many instances union rules and state regulations force the roads to use more men than are necessary and prevent the railroads from utilizing the time of the operating employees fully. Drastic revision in labor contracts is long overdue in this field; railway labor union policy preventing such revision can have only one result, namely, faster destruction of railway passenger service than need occur.

An aggravating factor in the decline of the interurban was the loss of external economies of large-scale production as the industry declined, coupled with the development of an "obsolescence" psychology. As the purchase of new interurban equipment fell, mass production of the equipment came to an end, as well as research leading to improvements. The cost of new passenger cars reached prohibitive levels compared with mass-produced buses Eventually the purchase of replacement parts became impossible as sup ers went out of business. Closely re- ed was the obsolescence phenomenon. the motor vehicle developed, the r and the bus became the "way to vel" and the interurban became out- oded and obsolete in the eyes of many ople. Cities became more hostile to cks on their streets and forced some andonments, partly by imposing on e interurbans paving requirements ich were greatly increased by the eds of motor vehicles. Shippers be- me reluctant to locate plants on in- urban lines for fear of loss of track nnections for carload movements. ere were exceptions; some communi- s tried hard to preserve their inter- bans and a few states gave tax relief, t for the most part by 1930 popular titudes toward the industry were no ger favorable.

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[5] Some "featherbedding" occurred in th interurban field, being eliminated in par when conditions became desperate in late years of the industry.

Conclusions

Review of the history of the inter- ban industry suggests several major atures, some of which are of signifi- nce beyond the scope of this partic- ar industry:

(1) *Investment decisions.* The slow te of expansion for the first decade dicates the difficulties a new and un- ied industry faces in raising capital d management talent. On the other nd, the experience of the 1900-7 riod illustrates the tendency of the owth of an industry to exceed the te justified by actual earnings once pectations of high future profits be- me widespread. At no time did the erage rate of profit on reported cap- l investment exceed 3.5 percent, yet fantastic number of projects for lines were developed. Rationing of money capital performed an important function in preventing even more waste of investment than occurred, but it by no means worked perfectly. Likewise, many lines built offered less potential than many that were never built; the completed network of lines was highly illogical in many respects. The experience also showed the tendency for new investment to fall sharply once the expected improvements in profits did not materialize over a period of time, even though actual profits had not yet fallen.

(2) *Cost-volume relationships.* A definite relationship existed between volume of traffic and cost per passenger-mile, although the latter was of course a function of other variables as well. It was impossible for a firm to cover operating expenses, let alone return on investment, if gross revenue was less than a certain figure per mile; cost per passenger-mile clearly fell over a considerable range, but not indefinitely, and the heaviest-volume roads had a somewhat higher cost than ones with substantial but less traffic volume.

(3) *Expectations.* The early expectations of improvements in earnings were not unreasonable, in light of the rate of economic growth of the areas served, but management and investors proved completely incapable of foreseeing the extent of expansion of motor vehicle use and the significance which this would have for the interurbans. It is very difficult for an industry to foresee its doom, and there is a constant tendency to believe that adjustments have been completed and stability reattained.

(4) *The productivity squeeze.* A major force destroying the interurbans was the productivity squeeze, the failure of output per worker to increase in a period in which industrial productivity was growing rapidly. This same force is likely to destroy railway (and even bus) passenger service, unless modification of union contracts and legislation allow substantial increases in output per man, and even these may be inadequate.

Government Saving and Investment in National Income Accounting: A Proposal

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IS THE PURPOSE of this paper to indi-
te how, within the framework of the
tional income and product accounts,
riations in the definition of govern-
ent saving could be useful for certain
rposes of economic analysis. In addi-
n, an attempt is made to compute
ch new measures of government sav-
g and investment on the basis of
isting data.

Current Concepts

In the national income and product
counts, as currently maintained by
e Department of Commerce, govern-
ent saving is measured by the gov-
nment surplus (or deficit) on income
d product transactions. This figure
obtained by deducting from govern-
ent income *all* government expendi-
res (as reported in the accounts),
cluding both consumption-type and
vestment-type expenditures.[1] In ef-
ct, all government expenditures are
eated as involving current consump-
on. Hence, no government transactions are included in the reported gross investment of the economy.

Much government expenditure does involve current consumption of output, such as expenditures for wages, food, clothing, transportation, and rent. However, many government outlays are similar to, if not identical with, business investment-type purchases in terms of both manufacture and use.

Construction of power generation and transmission facilities for private ownership is currently included in the gross investment of the economy while similar power facilities constructed for public ownership are not. Defense plants constructed for private firms are treated as investment outlays; similar plants constructed for the government are excluded, even though the government would usually lease these plants to the same companies for the production of the same or similar commodities.

Likewise, the acquisition by the federal government of inventories of metal and other industrial minerals is treated as a part of the consumption of the economy while accumulation by business firms of inventories of the identical items are included as investment.

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[1] *National Income,* 1954 edition, Supple-
ent to the *Survey of Current Business*
Vashington: Government Printing Office),
). 54-58.

Little justification seems to exist for the inclusion or exclusion of these and similar items in an economic classification of investment outlays solely on the basis of the legal status of the purchaser. Such a distinction may be useful for certain purposes. However, the complete exclusion of government purchases results undoubtedly in an understatement of the actual investment of the American economy.

Suggested Additional Measures

Given the definition of saving currently used in the Commerce accounts, these defects are not remediable. However, the treatment of all government expenditures as current consumption may be unnecessarily restrictive. If, for some purposes, this ground rule were relaxed, it would be possible to obtain a more comprehensive measure of the total saving and investment of the economy.

It is suggested that a measure of government saving be derived by deducting from total government receipts on income and product account: (1) government purchases of consumption-type goods and services, (2) transfer and interest payments, and (3) subsidies and the current deficit of government enterprises.

The resultant measure of government saving would be higher than the present one by the amount of government purchases of investment-type goods. Similarly, the total saving and investment of the economy would be higher by this amount.

The only additional requirement for information in this approach is the segregation of governmental investment-type expenditure. It should be noted that numerous difficulties of concept and availability of data are involved in such a task.[2]

Until recently, information on governmental investment outlays was available only in fragments and from scattered sources. For example, the annual budget document contains an analysis showing the investment outlays in the federal budget.[3] In that analysis, expenditures are treated as investment if in the main they yield benefits beyond the fiscal year in which the expenditures are incurred. This concept of investment embraces loans and additions to major commodity inventories as well as purchases of large equipment items and public works projects.

Shortcomings of the analysis include the fact that it is available only on a fiscal-year basis and with a lag of over six months after the close of the year for actual data. Also, it excludes the investment outlays by trust funds and government-sponsored enterprises and includes purchases of land and other existing assets. However, this analysis

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[2] "The calculation of the capital expenditures of the federal government . . . is probably the most difficult single task in the estimation of government saving. The basic reason for the difficulties is the lack of distinction between current and capital expenditures in the Treasury's own accounts, which makes it necessary to piece the estimates together from data not originally intended for the purpose. . . ." Raymond W. Goldsmith, *A Study of Saving in the United States* (Princeton: Princeton University Press, 1955), Vol. 2, p. 585.

[3] "Special Analysis D — Investment, Operating, and Other Budget Expenditures," *Budget of the United States Government for the Fiscal Year Ending June 30, 1960* (Washington: Government Printing Office, 1959), pp. 947-56.

f value because of the detail it pro-
es concerning specific governmental
estment outlays.

n a narrower field, the Department
Defense issues a monthly release
ich provides a basis for segregating
ital from current outlays of the
itary services.[4] It excludes the "civil
ctions" of the armed forces such as
construction of river and harbor
rks by the Corps of Engineers.

ortunately, a study by the National
ome Division of the United States
partment of Commerce contains the
ntial ingredients for a first approx-
ation of governmental investment
lays. It presents a breakdown of the
ss national product into output of
rable goods, nondurable goods, serv-
s, and construction and indicates the
rtion of government purchases of
ods and services which falls into each
these categories.[5]

For the purposes of the present study,
author has treated that portion of
ernment purchases of goods and
vices which is included in the du-
le goods and construction categories
a measure of government invest-
nt. It is believed that such a meas-
e of government investment would
comparable to the existing measure
business investment.

Table 1. Gross Government Investment and Purchases

(In billions of dollars)

Year	Gross government investment	Government purchases of goods and services
1947	6.5	28.4
1948	8.8	34.5
1949	11.5	40.2
1950	12.5	39.0
1951	23.1	60.5
1952	32.2	76.0
1953	32.5	82.8
1954	29.6	75.3
1955	27.1	75.6
1956	29.6	79.0
1957	33.9	86.2
1958	35.1	92.6

Source: *Survey of Current Business*, July, 1959, pp. 6, 7, 40; *U. S. Income and Output*, Supplement to the *Survey of Current Business* (Washington: Government Printing Office, 1958), p. 224.

It may be noted in this connection that, in the Commerce study, all of gross private domestic investment (except a portion of inventory change) is included under the durable goods and construction categories.

Estimates of government investment computed by the writer on the basis described previously are contained in Table 1. For purposes of comparison, the amount of total government purchases of goods and services is also shown. Governmental investment outlays, as here computed, have comprised from one-fourth to two-fifths of total government purchases during the past decade.

The computation shows that government investment consists in large part of purchases of durable goods from private business and construction of public works. A large proportion of these purchases are aircraft, missiles, naval ships, and other military weapon systems (see discussion in later section on "The Treatment of Military Outlays"). Military procurement outlays for ammunition and fuel are not included here, as they are treated as "nondurables" by the Commerce Department.

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[4] US Department of Defense, *Monthly*
port on Status of Funds by Budget Cate-
ry (EFAD-350) (Washington; processed).

[5] Lawrence Grose, "New Distribution of
tional Output by Goods, Services, and
nstruction, 1929-56," *Survey of Current*
siness, June, 1957, pp. 4-11. Revised data
contained in *U. S. Income and Output*,
pplement to the *Survey of Current Busi-*
ss (Washington: Government Printing
fice, 1958), and in *Survey of Current*
siness, July, 1959.

The allocation of government purchases between durables (investment-type outlays) and nondurables and services (consumption-type outlays) is admittedly based on incomplete data and approximations.[6] For example, all services of government employees are excluded from government investment, although similar private services may be included in business investment. Typical of such items are services rendered by government engineers and construction workers in connection with the development of roads, river improvements, and other public works projects.

Similarly, government purchases of nondurable items are excluded from government investment as computed in Table 1, even though such items may be used in connection with the construction of public works and the manufacture of durable goods by government employees. If additional data were available, it might be desirable to adjust for these situations.

It should be noted that the inclusion of all government purchases of durables in the investment category differs from the treatment of the private sector, where household durables are specifically excluded. It is the belief of the writer that government durables are typically more nearly comparable with business-type than with consumer-type durables in terms of the uses to which they are put. The examples of such similarities pointed out earlier include manufacturing plants and power generator and transmission facilities.

It may also be of interest to note the effect on the measure of gross investment (and saving) if the proposal made here were adopted. The accompanying chart shows the current as well as the proposed alternative series in relation to the trend of the gross national product for the years 1947-58.

It is difficult to form definite conclusions on the basis of the years shown in this chart. However, some relationships seem evident during the period:

(1) Gross investment (including government) showed greater stability than private investment alone. For example, the decline in private investment in 1952 was completely offset by the rise in government investment.

(2) Government investment expanded at a more rapid rate than private investment. The difference between results from the current method of computing the gross investment of the economy and the results from the method proposed here has widened substantially. Under current concepts approximately 15 percent of GNP has been devoted to investment outlays during the past decade. Under the alternative concept, over 20 percent is indicated.

The proportion of the gross national product of the USSR which was de

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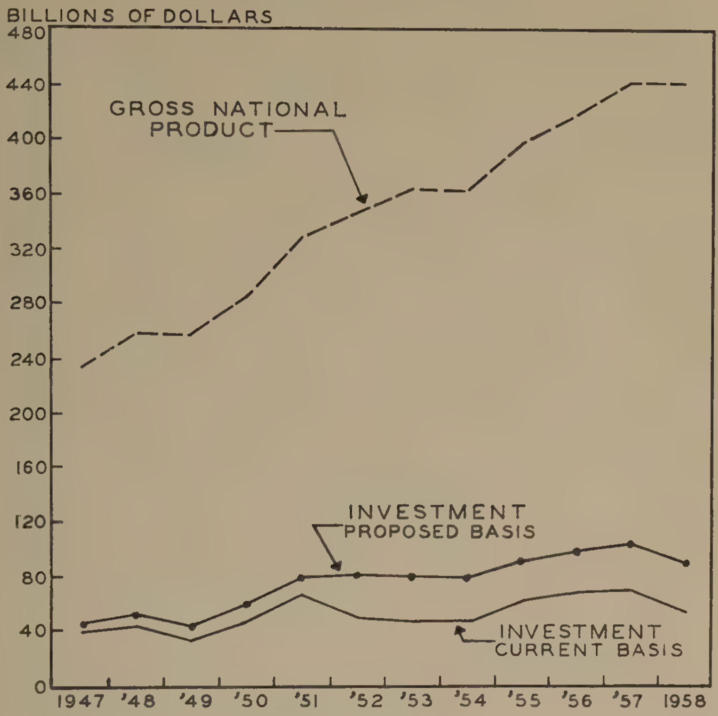
[6] *Cf. National Income,* 1954 edition, *op. cit.,* p. 157. The method used by the writer is illustrative and is not meant to substitute for the detailed, painstaking approach employed by the National Income Division for the estimates which that office actually publishes.

Alternate Concepts of Investment Compared with Gross National Product



ted to investment in 1955 has been timated at about 20 percent.[7] For ch international comparisons, the finition of investment suggested in is paper may be more pertinent in ew of the different proportions of onomic activity within the public and ivate sectors of the economies of var- us nations.

Government Saving

The effect on government saving of the suggested concept of investment would be great. Currently, government saving is measured by the surplus of government receipts over expenditures on income and product transactions. The suggested alternative measure of government saving contained in Table 2 is based on the excess of government receipts over governmental non-investment expenditures.

Net saving (saving after making allowance for depreciation of government assets) would, under either alternative, be much lower than the gross figures shown here. The estimation of depreciation on government assets is a prob-

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[7] Morris Bornstein, "A Comparison of viet and United States National Product," Joint Economic Committee, *Comparisons the United States and Soviet Economies* /ashington: Government Printing Office, 59), p. 377.

Table 2. Gross Government Saving
(In billions of dollars)

Year	Current concept	Suggested alternative
1947	13.3	19.8
1948	8.2	17.0
1949	−3.1	8.4
1950	8.2	20.7
1951	6.1	29.2
1952	−3.9	28.3
1953	−7.1	25.4
1954	−6.7	22.9
1955	2.9	30.0
1956	5.2	34.8
1957	1.4	35.3
1958	−10.7	24.4

Source: Table 1; *U. S. Income and Output,* Supplement to the *Survey of Current Business* (Washington: Government Printing Office, 1958), p. 188; *Survey of Current Business,* July, 1959, p. 28.

lem area in federal statistics which is beyond the scope of this paper.[8]

The Treatment of Military Outlays

Following the procedure of the Department of Commerce in the study mentioned earlier, outlays of the federal government for military procurement, except for ammunition and fuel, were grouped with other durables and construction expenditures.[9] Without necessarily deciding whether military procurement is or is not productive, within the context of some subjective evaluation of economic activity, it may be helpful to show separately this categor of investment expenditures.

Table 3 contains a rough estimate o military investment outlays. If it wer so desired, these amounts could be included with governmental consumption type outlays and only nonmilitar investment expenditures would be included in the investment of the economy. On the basis of the data shown here it can be seen that, since the termination of the fighting in Korea, military investment has constituted a declining proportion of gross government investment.

Data contained in the Defense Department publication mentioned previously were used for the derivation of the estimates of military investment contained in Table 3. The categories taken were (1) major procurement and production and (2) construction. These categories primarily consist of procurement of aircraft, ships, missiles, and other heavy equipment and construction of air bases and other military facilities. The procurement and con-

Table 3. Military Investment

Year	Amount (In billions of dollars)	Percent of gross government investment
1951	11.6	50.2
1952	19.7	61.2
1953	21.0	64.6
1954	17.3	58.4
1955	15.8	58.3
1956	15.3	51.7
1957	15.1	44.5
1958	16.5	47.0

Source: US Department of Defense, *Monthl Report on Status of Funds by Budget Categor* June 30, 1956, p. 20; June 30, 1957, p. 3 June 30, 1958, p. 5; June 30, 1959, p. 5.

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[8] For an exploratory attempt at estimating depreciation of government assets, see Robert Hubbell and Wilfred Lewis, Jr., "Capital Consumption by the Federal Government," *National Tax Journal,* Vol. 22, No. 1 (March, 1959), pp. 22-36.

[9] US Department of Commerce, technical note to article on "New Distribution of National Output by Goods, Services, and Construction, 1929-56," *Survey of Current Business,* June, 1957, p. 4.

uction for the reserve programs were luded but outlays for ammunition re excluded. With the cooperation the federal agencies involved, more ined estimates of the military-civil ak could be obtained which would more consistent with the investment ncept developed earlier.

Conclusion

This study is an attempt to show the irability and feasibility of providing alternative to the definitions of gov- nment saving and government invest- nt currently used in national income alysis. Expanding the concept of ss investment to include appropriate vernmental outlays would give a re accurate indication of the extent which the output of the economy is t currently consumed but retained for future utilization. Likewise, the broader measure of government saving that would result would give a better picture of the current operations of government from the viewpoint of income and product analysis.

It is not the purpose of this paper to evaluate the relative effectiveness or desirability of public or private investment. Such analyses may be more useful when limited to specific programs and projects rather than the broad aggregates discussed here. However, the data presented here may be helpful in making various comparisons between the public and private sectors of the economy, particularly in assessing the relationships between fluctuations in investment and the over-all level of gross national product and other broad indicators of the performance of the economy.

The Lake Levels Controversy

GRETCHEN SWIBOLD*

E CITY of Chicago and the Metro-
litan Sanitary District of Greater
icago want to treat and dispose of
mestic and industrial wastes in the
eapest possible way, without, of
urse, endangering the public health.
r almost sixty years they have relied
on the diversion of water from Lake
ichigan into the Illinois Waterway
nd from there into the Mississippi
ver) to make the inexpensive process
sewage dilution possible. Amounts
thdrawn have varied from 10,000
bic feet a second to the present 1,500
, in addition to that withdrawn for
mestic and industrial use in the area.

Although until the mid-1920's dilu-
n was the primary means of treat-
ent, since the 1940's sewage plants
ve treated up to 90 or 92 percent of
e sewage. The problem is how to
at the rest most effectively. Sanitary
strict engineers assert that it is not
ssible to make the sewage treatment
ants perform 100 percent successfully.
the other hand, they state that the
maining 8 or 10 percent of the sewage cannot be left untreated. In a population center the size of metropolitan Chicago, it is comparable to the sewage of a city of 800,000 persons.

The problem of increased water diversion at Chicago involves the political and economic interests of many public and private groups outside of Chicago itself. The list includes several Great Lakes and inland waterway organizations, the six Great Lakes states (Minnesota, Wisconsin, Michigan, Ohio, Pennsylvania, and New York), Vermont, states along the Mississippi River and in the Pacific Northwest, downstate Illinois, Canada, and the federal government.

Private Organizations and Diversion

Private organizations advocating diversion consist mainly of inland waterway organizations supported by barge companies and various industries located along the waterways. The American Waterways Operators, for example, is described by its representatives as a national association of domestic water carriers and related industries. It emphasizes that any additional water provided for the Waterway would undoubtedly improve the production efficiency of industries which take process water from it.[1] Other inland waterway groups favoring diversion are the Chicago District Waterways Association, the Upper Mississippi River Association, the Mississippi River Valley Association, and the Ohio Valley Improvement Association. Each sent a representative to congressional hearings in 1957 and/or 1958. The first was described by its representative as made up of industry, barge operators, and other companies incidental to waterways of the Chicago area. The Waterways Association argues simply that with more and more boats on the Waterway more water is needed.[2] The Upper Mississippi River Association consists of waterway industries from Keokuk, Iowa, to St. Paul, Minnesota. This area has an increasingly active commerce with Chicago and is especially concerned with the low water problem at Alton's lock and dam number 26.[3] The Mississippi River Valley Association includes associations, chambers of commerce, municipalities, firms, and individuals which represent industrial, commercial, transportation, and agricultural interests throughout the Midwest (at its 1956 convention there were delegates from 30 states). In supporting diversion at the hearings, its spokesman emphasized the group's interest in the development of soil and water resources for the greatest number of people.[4] Members of the Ohio Valley Improvement Association are involved in waterway industries along the Ohio River, Illinois Waterway, and lower Mississippi River.

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red under the direction of Professor Gil-
t Y. Steiner.

Two other organizations whose spokesmen appeared at congressional hearings after the problem had already been discussed for four or five years in Congress were the Chicago Association of Commerce and Industry and the Pekin Association of Commerce. The first appeared interested in diversion primarily as a means of alleviating Chicago's sanitary problems. Science and technology, said their representative, cannot provide the quantities of oxygen needed by the Waterway.[5] The second spoke on behalf of a mandatory uniform water flow at Pekin whose industries (including American Distilling, Corn Products, and Commonwealth Edison) depend on river water for cooling purposes and are forced to run inefficiently during low water stages.[6]

Aside from the Chicago Association of Commerce and Industry, apparently the only active private group on the Great Lakes to favor diversion is the Association for the Protection of Great Lakes Properties. Members are property owners from Wisconsin, Michigan, Illinois, and Indiana interested in minimizing damage to lakeshore property and to the shoreline itself. In 1952 when lake levels were abnormally high the Association advocated an increase

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[1] U.S. Senate, *Diversion of Water from Lake Michigan*, Hearings before the Subcommittee on Flood Control, Rivers and Harbors, Public Works Committee, 85th Cong., 2nd. Sess., pp. 180-81.

[2] U.S. House of Representatives, *Lake Michigan Water Diversion*, Hearings before the Subcommittee on Rivers and Harbors, Public Works Committee, 85th Cong., 1st Sess., pp. 52-56.

[3] *Ibid.*, p. 55.

[4] *Ibid.*, p. 57.

[5] U.S. Senate, *Diversion of Water from Lake Michigan*, *op. cit.*, pp. 170-72.

[6] *Ibid.*, p. 177.

10,000 cfs, maximum capacity of e Waterway.[7] Even after the lakes ad receded considerably it still worked r a further increase.

Strongest opposition to increased di- ersion comes from the Lake Carriers ssociation which in 1956 was made p of 26 companies operating 312 bulk rgo (iron ore, coal, grain, and so on) essels which carry about 75 percent of reat Lakes cargo. Its spokesmen have ppeared at nearly every congressional earing by the House and Senate Pub- c Works Committees and subcommit- es since 1952 to testify that carriers e usually loaded to capacity and that ven a slight lowering of lake levels ould mean a decrease in payload. estimony by the Corps of Army En- neers upholds this contention.[8] Larger ulk carriers transport up to 100 tons cargo per inch of immersion.[9]

The Great Lakes Harbor Association as interests closely allied to those of e Lake Carriers but is composed of ort cities rather than private busi- esses. Sixteen of its 24 members are Michigan, six are in Wisconsin, one in Ohio (Toledo), and one is in ew York (Buffalo). Its primary con- ern is that lower lake levels will neces- tate expensive harbor dredging and ove harmful to Great Lakes pros- ects for increased shipping.[10] The Cleveland Chamber of Commerce appeared at hearings in 1957 and 1958 to express concern over diversion's negative effects on lake shipping, connecting channels, and water conservation, this last in view of industry's increasing need for water.[11]

Also opposed was the Illinois Valley Antidiversion Association, organized about 1947. Its views reflected those of downstate Illinois communities which at first feared increased flood hazards and water pollution. Its spokesman pointed out that sediment brought downstream by diversion covered the riverbed of the Illinois River and prevented the drainage of water into underground pools essential to industries around Peoria.[12] But by 1958, many downstate interests supported additional diversion because it would encourage water conservation, abate water pollution, and further industrial development.[13] In a 1957 House floor debate Congressman Michel presaged the change in attitude when he indicated that Peoria industry needed more water and that he would support diversion if the diversion bill would include a regulation of flow on the Waterway at Pekin.[14]

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[7] U.S. House of Representatives, *Illinois aterway,* Hearings before the Public Works ommittee, 82nd Cong., 2nd Sess., p. 99.

[8] U.S. House of Representatives, *Lake ichigan Water Diversion,* Hearings before e Public Works Committee, 83rd Cong., t Sess., pp. 2-4.

[9] U.S. Senate, *Lake Michigan Water Di- rsion,* Hearings before the Public Works ommittee, 84th Cong., 2nd Sess., p. 68.

[10] *Ibid.,* p. 32.

[11] U.S. House of Representatives, *Lake Michigan Water Diversion,* Hearings before Subcommittee on Rivers and Harbors, Public Works Committee, 85th Cong., 1st Sess., pp. 127-28.

[12] U.S. House of Representatives, *Illinois Waterway, op. cit.,* p. 33.

[13] The Illinois Valley Antidiversion Association actually made an appearance at a congressional hearing only in 1952. Some of its members later switched over to the Illinois River Valley Association which supported diversion.

[14] U.S., *Congressional Record,* 85th Cong., 1st Sess., 1957, Vol. 103, p. 7438.

Reaction of Other States and Canada

Great Lakes states oppose diversion for many of the same reasons offered by the lake carriers. They contend that a diversion of either temporary or permanent duration would have adverse effects upon lake levels and consequently upon harbor depths and the development of Great Lakes shipping. Any diversion, they say, is inconsistent with United States-Canadian expectations for the St. Lawrence Seaway.[15] They are afraid, moreover, that a temporary increase for sewage purposes at Chicago may lead to a permanent increase there and to similar requests by other Great Lakes cities, all of which should be responsible for treating their own sewage.[16] Several congressmen from Great Lakes states have held that Great Lakes water should be controlled jointly by all the Great Lakes states and that one city alone should not be able to divert water arbitrarily.[17] Some of these same men have been particularly adamant about an over-all program for controlling Great Lakes levels rather than haphazard attempts at control such as diversion at Chicago.[18] (Most of the diversion bills have included the control of lake levels as one of their reasons for being.) There has been opposition, also, to the bills' arbitrary specification of increased amounts, as some of the area's congressmen feel a diversion program should be more flexible and should vary with conditions on the Lakes and along the Waterway.[19] In addition to their opposition to diversion itself, many Great Lakes officials have stated they felt that the judiciary or the International Joint Commission should determine diversion questions and that Congress has no jurisdiction over the problem.[20]

Interest on the part of other states varies with their location. Vermont, for example, has opposed diversion because it could diminish waterpower at Niagara, which New York shares with it.[21] Oregon and Washington have opposed diversion because they feared it would encourage Canada to divert water from the Columbia Basin without first consulting the United States. However, in 1958, senators from the Pacific Northwest states finally supported diversion, saying that diversion of water by Illinois for sanitary purposes was more defensible than Canada's desire for more water power.[22] States along the Mississippi have, of course, been in favor of diversion all along since any water flowing down the Illinois Waterway would eventually increase the often sluggish flow of the Mississippi.

Canadian reaction has been of two kinds. Her monetary reasons for opposing diversion are similar to those of the lake carriers and the Great Lakes states. She has financial interests in the success of the Seaway and in power plants at Niagara. On another more speculative level, it has been suggested by the *Chicago Sun-Times* that the Canadian party in power finds it politically expedient to oppose unilateral action on boundary waters by the United States, currently unpopular partly at least because of its policies on wheat and its establishment of import quotas on oil, lead, and zinc.[23] The Canadian government, moreover, felt it could not ignore strong political pressures from the St. Lawrence River area particularly during the year of the Seaway opening. Canadian claims to consultation rest upon a United States-Canadian treaty of 1909 which states that, in addition to diversions already permitted, no further uses of boundary waters on either side affecting the levels of either side shall be made without the approval of both countries. Is Lake Michigan a boundary water? Senator Kerr, chairman of the Subcommittee on Flood Control, Rivers and Harbors, said at hearings in 1956 and 1958 that it is not. At its nearest point it is still about 38 miles from Canada.[24]

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[15] U.S. House of Representatives, *Lake Michigan Water Diversion,* Hearings before the Subcommittee on Rivers and Harbors, Public Works Committee, 85th Cong., 1st Sess., p. 99.

[16] *Ibid.,* pp. 110-13.

[17] *Ibid.,* p. 70.

[18] U.S., *Congressional Record,* 84th Cong., 1st Sess., 1955, Vol. 107, p. 9991.

[19] U.S. House of Representatives, *Illinois Waterway,* Hearings before the Public Works Committee, 82nd Cong., 1st Sess., p. 27.

[20] *Ibid.,* p. 135.

[21] U.S., *Congressional Record,* 84th Cong., 2nd Sess., 1956, Vol. 102, p. 15082.

[22] U.S. Senate, *Diversion of Water from Lake Michigan, op. cit.* For Neuberger's change of mind, see pp. 106 and 378; for Morse's, see p. 223; and for Magnuson's views, see p. 331.

What Are the Effects of Diversion?

After August 9, 1956, when President Eisenhower pocket vetoed diversion for the second time, the Bureau of the Budget requested the Corps of Army Engineers to prepare a special report on the effects of increased water diversion. The report was concerned mainly with an increase of 1,000 cfs for three years and its effect on Great Lakes and Illinois Waterway navigation and on Great Lakes levels.

Some of its most specific findings dealt with water power.

> The estimated reduction in generation of hydroelectric energy that would result from a three-year increase in the diversion at Chicago would fall between a minimum of 188 million kilowatt-hours and a maximum of 443 million kilowatt-hours, depending on when the diversions were started and when proposed additional hydroelectric plants are put into operation. This amount of reduction is a small fraction of 1 percent of the total energy production at the plants affected . . . [the] estimated value of the maximum possible reduction at plants in New York and Ontario . . . would be $918,000 over the entire period that the increased three-year diversion would have any effect. The total value of the minimum reduction . . . would be $408,000. During this period the increased flow in the Illinois Waterway would permit an increase in generation at the existing Lockport plant of 70,400,000 kilowatt-hours, an offset of about 16 percent of the estimated maximum reduction in generation on the Niagara and St. Lawrence Rivers. This increase would have a total value of $202,000.[25]

Thus there would be no actual loss for the United States until plant capacities were sufficient to use all the water available, probably not before 1960 or 1961.

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[23] Thomas B. Ross, "Canada Hints at Lake Compromise," *Chicago Sun-Times,* April 24, 1959, p. 3.

[24] U.S. Senate, *Diversion of Water from Lake Michigan, op. cit.,* p. 245.

[25] U.S. Senate, Document No. 28, 85th Cong., 1st Sess., *Effects of Additional Diversion of Water from Lake Michigan at Chicago,* Letter of Submittal by E. C. Itschner, Chief of Engineers, U.S. Army, p. vi.

Findings pertaining to the effects of diversion on lakeshore property and on Mississippi River navigation have shown that these effects tended to be beneficial but were not measurable in monetary terms for so short a period. Effects on Great Lakes navigation tended to be adverse but could not be measured monetarily either.[26] Three things are worth noting here, however. (1) A spokesman for the Corps of Engineers at a congressional hearing in 1953 agreed with a representative of the lake carriers that the latter usually do load to capacity and that for each one inch the Great Lakes are lowered the carriers lose 100 tons of payload. Diversion would be especially harmful in low-water periods.[27] (2) If the diversion were a permanent one it would be likely to affect the loading of United States Great Lakes vessels by about 1985 so that an annual loss of $240,000 would result.[28] (3) Neither a temporary nor a permanent diversion would have any measurable effect on the navigation of Lake Ontario or the St. Lawrence River.[29]

In commenting on the report, Brigadier-General Person of the Corps of Army Engineers declared that only a study of permanent diversion would yield answers to these monetary questions. Other of his comments based on the study included the following: a three-year increase in diversion would lower Lakes Michigan and Huron approximately five-eighths of an inch and Lake Erie three-eighths of an inch, and it would increase the velocity of the Illinois Waterway one-tenth mile per hour, a slightly adverse effect since 85 percent of the traffic on the Waterway is northward and against the current.[30] (Thus it would seem that it is not so much the barge operators who need more water from Lake Michigan as the industries located along the Waterway which use the water for processing or cooling purposes.) General Person also added that no further legislation is necessary to obtain data on Waterway or Great Lakes navigation or on the level of Lake Michigan, but legislation is needed to find the degree of improvement in actual Waterway conditions.[31]

Finally, it should be noted that whatever the effects of diversion may be they are not instantaneous. It takes five to ten years to establish an equilibrium under altered conditions. Although 95 percent of the lowering is accomplished by the end of the fifth year after diversion or increased diversion begins, the effects are evident for about fifteen years.[32]

Diversion in Congress

Chicago has pushed its main offensive in the United States Congress, where since 1952 it has usually been successful, only to be thwarted by the President, who has twice chosen to veto diversion bills passed by Congress.

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[26] *Ibid.*, p. VIII.

[27] U.S. House of Representatives, *Lake Michigan Water Diversion,* Hearings before the Public Works Committee, 83rd Cong., 1st Sess., pp. 2-4.

[28] U.S. Senate, Document No. 28, *op. cit.*, p. VII.

[29] *Ibid.*, p. VI.

[30] U.S. House of Representatives, *Lake Michigan Water Diversion,* Hearings before Subcommittee on Rivers and Harbors, Public Works Committee, 85th Cong., 1st Sess., pp. 21-23.

[31] *Ibid.*, p. 21.

[32] U.S. House of Representatives, *Illinois Waterway,* Hearings before the Public Works Committee, 82nd Cong., 2nd Sess., pp. 92-93.

Diversion bills introduced in Congress have become more precise over the years, and they have picked up stronger support in the process. Those submitted earliest, in 1952, were vague. Several merely authorized Illinois and the Chicago Sanitary District under the direction of the Secretary of the Army to help control the level of Lake Michigan by diverting 2,500 cubic feet a second from it into the Illinois Waterway for an unspecified length of time. In committee, at the suggestion of the Army Engineers, a three-year time limit was added, the three-year period to be used for studying the effects of diversion on Lake Michigan.[33] The bill in question, H.R. 8165, was then reported favorably, but it did not reach the House floor. Fourteen identical bills submitted to the House in 1953 were like the amended 8165 of the previous year, and one of them, H.R. 3300, moved successfully, with no further changes, through the House and Senate.

In 1955 changes were again made in diversion bills, these in order to eliminate opposition from southern Illinois. The three new limitations were that diversion at no time was to exceed 5,000 cfs, that the Secretary of the Army should have direct control of diversion, and that there should be no diversion during flood times on the Illinois, Des Plaines, Chicago, and Calumet rivers. All later bills debated by the House and Senate incorporated these amendments. They also included the amendment insisted upon by Congressman Michel of Pekin in the House debate of 1957 — that the flow of the Illinois River at Pekin should be regulated.[34] The latest in the series of changes, included in 1958, was the stipulation that a study of diversion should last only one year.

Bills achieving passage have originated in the House. The Senate in 1954 produced no bills of its own (Senator Douglas, in fact, did not participate in the discussions of diversion that year), and in 1956 and 1958, although both Illinois senators submitted bills, it was H.R. 3210 and H.R. 2, respectively, which were considered.

Sponsorship of diversion bills in the House has come mainly from Cook County congressmen, except in 1952 when there were four non-Cook County non-Illinois bills or resolutions and four bills sponsored by Cook County members. At that time the Great Lakes were unusually high and several representatives from New York and Michigan regarded diversion as a means of lowering water levels and lessening property damages.[35] A year later there were fourteen bills, all submitted by Illinois congressmen, half of whom were Republicans and half of whom were Democrats and thirteen of whom came from Cook County. The fourteenth bill was that of Congressman Price of East St. Louis. Except for the late Representative Bowler, every Cook County representative proposed a diversion bill.

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[33] *Ibid.*, p. 23.

[34] U.S., *Congressional Record*, 85th Cong., 1st Sess., Vol. 103, p. 7434.

[35] Non-Cook County bills were H.R. 6080 and H.R. 6956 sponsored by Hoffman, Republican of Michigan; H.S.R. 358 by Ford, Republican of Michigan; and H.C.R. 189 by Ostertag, Republican of New York.

In 1955, twelve of the sixteen diversion bills were sponsored by Democrats, nine of whom came from Cook County; the remaining three sponsors were Price of East St. Louis, Mack of Carlinville, and Gray of West Frankfort. All four Republican bills also came from Cook County members. Sponsorship in 1957 was much like that of 1955. Of seventeen bills, only five were sponsored by representatives outside of Cook County,[36] and eight of the twelve representatives from Cook County were Democrats. Most recently, in 1959, House sponsors of diversion bills again included twelve of the fourteen representatives from Cook County and five from elsewhere in Illinois. Only five of the seventeen were Republicans, three of whom were residents of Cook County.

Both in committee and in floor debates proponents of diversion broadened as much as possible the appeal of what appears to be an essentially local issue. They appealed to lakeshore property owners who had suffered high-water damage, thereby cutting somewhat into Great Lakes opposition (especially in 1954 and 1955 votes); to congressmen from constituencies along the Mississippi; to those interested in increasing trade and navigation between the Great Lakes and the Gulf of Mexico; to those regarding more water in the Waterway as an aid to national defense; to Seaway states on the grounds that a busier Waterway would increase Seaway traffic; to sportsmen and conservationists concerned about the adverse effects upon wildlife of a polluted Waterway; to congressmen wanting to take the jurisdiction of diversion from the hands of the Supreme Court; and to congressmen who oppose consulting Canada on a local issue such as diversion for sewage purposes.

However, Chicago's real strength in the legislature is a result not of all the arguments for diversion it can muster, but of support by the Democratic Party. Diversion has become an increasingly partisan issue, with Democrats more single-minded in their support of diversion than Republicans in their opposition to it. Many Republican congressmen voted against diversion in 1954, for it in 1955, and against it in 1957. Moreover, among the Great Lakes states only Wisconsin cast all its votes against diversion in every vote, although Ohio and upstate New York gave Wisconsin fairly consistent support. In 1955, Michigan cast only one vote against diversion.

Voting patterns in the Senate were similar. In 1956 support for diversion came from 37 Democrats and 6 Republicans—Dirksen, Capehart, Hruska, Bridges, Case, and Mundt — and in 1958 hard core support came from 18 Democrats and 5 Republicans — Case, Kuchel, Watkins, Dirksen, and Hoblitzell.

Showing the tremendous congressional successes of diversion advocates are important House votes cast in its favor in 1954 (234-150), 1955 (316

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[36] Price, Mack, and Gray, as in 1955, plus Keeney of Wheaton and Michel of Pekin.

74), 1957 (222-144), and 1959 (238-142).[37] Senate voting to date has been much closer. In 1958, diversion forces actually lost when Senator McNamara offered an amendment to the House bill after the House had already adjourned, making it impossible to obtain its agreement or compromise. Senator Proxmire of Wisconsin finally killed the bill altogether by threatening to filibuster.

Canada and the Executive

Canada has pleaded her case through letters to the State Department which, along with the International Joint Commission[38] (in 1952 and 1953) and the Bureau of the Budget (especially in 1959), has been her primary spokesman in dealings with the legislative branch. The State Department, however, has been sporadic in its attendance at diversion hearings, failing to appear in 1953, 1955, 1957, and 1958. It has also seemed on occasion not to have its story straight or to take a clear stand. For example, on July 28, 1958, the department revealed for the first time a letter from Canada opposing diversion, dated January 6, 1958,[39] and the next day Senator Neuberger received a note opposing diversion from the department's legal adviser. But on August 1 he received another note, this one from Assistant Secretary of State Macomber, saying that Canada had no objection to a diversion for one year.[40] The Budget Bureau then announced that it, too, had no objection to such a diversion.[41] It is not clear why the State Department withheld the January 6 Canadian note or why Canada changed its policy just at that time, since in February and April of 1959 it once again opposed diversion, even within a one-year plan.

Senator Wiley on the Senate floor in 1958 accused the State Department of pressuring Canada into not objecting,[42] an unusual claim because at other times the senator has been accused of asking the State Department to pressure Canada into objecting. There have been, in fact, many complaints among pro-diversionists that the department has worked against them.[43] This talk turned into action when Senator Douglas and Congressman Yates took diplomacy into their own hands and went themselves in April, 1959, to see Prime Minister Diefenbaker. It is not yet clear what, if anything, they achieved.

President Eisenhower's vetoes have been Canada's most effective ally. In both memoranda of disapproval the President gave Canada's opposing position as one of the reasons for his action. Both memoranda also reflected a concern about the method of controlling lake levels. They read, in part, "All methods of control of lake levels and protection of property on the Great Lakes should be considered before arbitrarily proceeding with the proposed increase" and "The diversions are authorized without reference to negotiations with Canada." The second memorandum added that the President was asking the State Department to engage in discussions with the Canadian government in order to work out a solution.[44]

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[37] Votes on recommittal (1954, 1955), passage (1957, 1959).

[38] Created by a United States-Canadian boundary water treaty, January 11, 1909.

[39] U.S. Senate, *Diversion of Water from Lake Michigan, op. cit.*, p. 85.

[40] *Ibid.*, p. 378.

[41] *Ibid.*, p. 87.

[42] U.S., *Congressional Record*, 85th Cong., 2nd Sess., 1958, Vol. 104, p. 17826.

[43] "Why Canada Adopts Tough Lake Policy," *Chicago Daily News*, April 21, 1959, p. 6.

The Great Lakes States and the Judiciary

Although they have not always got what they wanted, the Great Lakes states have been most aggressive in the Supreme Court. In the legislature they have lost their case to Illinois nearly every time and were saved only by the executive veto or a Wisconsin filibuster.

Between 1922 and 1926 the six states filed suits with the Court requesting that Illinois be enjoined against any further diversion of Lake Michigan water into the Sanitary Canal. This was their first and most ambitious move. They also wanted the Court to find that, according to a congressional act of March 3, 1899, Congress itself must approve any obstruction in navigable waters. They were concerned that in 1925 the Secretary of War had allowed Illinois to begin diverting 8,500 cfs with the stipulation that Chicago take immediate steps to carry out a ten-year construction program for sewage treatment.

In its decision of January 14, 1929, the Court said that Congress need not approve each obstruction of this kind so long as some federal authority does. In this case it was the Secretary of War. Other sections of the decision were more satisfactory to the states. If diversion is not for navigation purposes, it is without legal basis, declared the Court. Moreover, finding that the lakes, except Superior, were being lowered by diversion, the Court decided that diversion must be ended — although by degrees in order to protect the health of those living near the Waterway (*Wisconsin* v. *Illinois,* 278 US 367).

The states in 1930 were unable to convince the Court that Chicago should return domestic-use water to Lake Michigan. It continued to permit water for domestic pumpage and for outflow from the drainage canal. The amount involved was not excessive, according to the Court, and it would not be entirely pure even after treatment (*Wisconsin* v. *Illinois,* 281 US 179). In 1959 the lake states made a similar plea and were accused of insincerity. The Supreme Court was sufficiently impressed to order the question reopened and to appoint a Special Master. His findings and recommendation to the Court may forestall any congressional action in 1960.

Upon a complaint made by the six states in 1932, the Supreme Court found that the Sanitary District was failing inexcusably to prepare for the construction of the sewage treatment works called for by the Court in its 1930 decree. It called upon the state to help meet the financial obligations involved and chided the Sanitary District for its inaction (*Wisconsin* v. *Illinois,* 289 US 395).

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[44] For the 1954 veto memorandum, see U.S. House of Representatives, *Journal,* 83rd Cong., 2nd Sess., p. 1107; the 1956 veto memorandum is in the House *Journal,* 84th Cong., 2nd Sess., p. 951.

In sum, the Great Lakes states have not succeeded in persuading the Court to abolish diversion into the canal or to force Chicago to return domestic pumpage to Lake Michigan; but by applying to the Court they did see that the 1930 decree was carried out, and they have achieved the protection, at least on the part of the Court, of limitations on reasons for which Chicago may divert water.

Summary

Most of the people interested in the diversion problem have been successful to a degree in their various efforts. Chicago has been permitted to continue diverting Lake Michigan water in limited amounts, and the city benefits greatly from heavy traffic on the Illinois Waterway and from an unlimited source of water for domestic and industrial use. Downstate Illinoisans have been provided with safeguards should Congress increase diversion. Great Lakes states have been assured that diversion except for navigation purposes is unacceptable to the United States Supreme Court, and they have protested so vigorously that Illinois now seeks much less water than it once did. The Executive Branch has thus far been able to keep Canada happy by quashing legislative support of Illinois. And since the 1,500 cfs rate was achieved, private interests have so far neither gained nor lost, except on paper, although it seems that industries along the Waterway would gain most if an increase were legislated.

It appears that unless the State Department makes an agreement with Canada specifically regarding diversion at Chicago, Canadians will continue to protest bills permitting increased diversion and the President will continue to veto them. It appears, too, that even should a bill satisfactory to Canada be worked out, the lake states could challenge it in the federal courts, contending that its *raison d'etre* is to solve Chicago's sewage problems, not to improve navigation on the Illinois Waterway, which, as Army Engineers have already reported, contains enough water even for its increasingly heavy traffic today.

Books Reviewed

Labor and Economic Development. Edited by Walter Galenson (New York: John Wiley, 1959. Pp. xiii, 304. $6.75.)

For the past five years the industrial relations centers at California, Harvard, Princeton, MIT, and Chicago have been cooperating on studies of labor and economic development in selected countries around the world. This volume of essays is a product of that cooperation, exploring "a particular category of social phenomena which has its origin in industrialization: the creation and disciplining of a nonagricultural labor force" (pp. 1-2). The book contains five essays — one on India (by C. A. Myers), one on Japan (by R. A. Scalapino), one on Egypt (by F. H. Harbison), one on French West Africa (by E. Berg), and one on the British West Indies (by W. H. Knowles) — and an introduction by the editor in which certain generalizations are drawn from the country papers.

The essays on the individual regions are written within a more or less common framework, with attention focused upon a limited number of issues. All have introductory remarks on the economic, political, and sociocultural backgrounds of the regions and discussions of the kinds of modern economic development that have taken place. Each author then describes the experience of transforming a traditional agricultural population into a modern urban and industrial labor force and considers the problems associated with obtaining a committed and disciplined wage-working group. The largest part of each essay is devoted to the emergence of working-class organizations and the industrial relations forms and problems which appear in these societies that are pressing for economic development. One is given a description of trade union and labor movement history, the strength and weakness of each, the nature of leadership, political involvements, the character of collective bargaining, and the role of the state in the whole industrial relations process.

The publication in 1951 of W. E. Moore's volume, *Industrialization and Labor,* marked the high point of the classical view that industrialization involved the introduction of a way of life so vastly at odds with traditional agricultural civilization as to make the process of mobilization and commitment of workers to industrial employment extremely difficult. The extensive literature of that classical tradition as presented to us by historians, sociologists, and anthropologists — whether describing the early industrial revolution in Britain or more recent experiences in Asia, Africa, and Latin America — emphasized the enormous problems of labor force recruitment and discipline during the early stages of industrialization. The central core of the traditional analysis highlighted the difficulties of recruiting a labor force adequate for the growing needs of new industry. It stressed the high rates of absenteeism, turnover, and tardiness; mass desertions from factories during harvest periods; difficulties of imposing effective work discipline inside the factories; and the backward-sloping supply curve of labor. I suggest that Moore's book represents the high point of this essentially romantic tradition, because since that time we have begun to get in bits and pieces studies which suggest that a very different interpretation of the evidence is possible. However, at no point until now has the canonical doctrine been confronted by a substantial body of evidence in a single volume. This collection of essays represents the first significant foray in strength by the revisionists.

The essayists suggest that on the whole recruitment of a labor force for the modern sector as it developed in the various regions has not been a difficult enterprise. As Professor Galenson points out in his introduction, the visible instabilities of the labor force in newly developing societies seem to be more a function of management policies than of any lemming-like lust of workers to return to the land. It is not so much the sociopsychological propensities of the work force that make for its indiscipline but the fact that "labor is relatively cheap and there is a tendency to use it wastefully, a practice which does not breed careful habits in the laborer himself" (p. 3).

The work force in traditional societies seems to be responsive to the same economic incentives that mobilize and commit the labor force in economically advanced societies. This seems to be true whether one refers to the densely populated Asian or Caribbean areas or to relatively thinly peopled French West Africa. With regard to that traditional bogy, the backward-sloping supply curve, Berg in perhaps the most suggestive of the essays in this respect, reports (p. 197) that in French West Africa the existence of such a supply function is highly unlikely. There is one point that does not emerge in any of the essays but it seems to be a crucial factor in explaining the apparent evidence of a backward-sloping supply curve: where the phenomena does occur in newly developing areas it seems to appear not so much because workers desire to achieve only a "target income" but because a large variety of consumer goods on which to spend income is absent.

The evidence of the essays indicates that lack of industrial skill in these newly developing areas, typically considered a serious impediment to economic development, is a temporary phenomenon and is, in fact, a function of lack of economic development rather than its cause. Once again, the problem is a managerial one rather than a consequence of the kind of labor force utilized.

The greatest space in each of the essays is devoted to the kinds of working-class action that emerge with the appearance of a proletariat. The essays give us a cross section of possible labor movement and industrial relations forms. Here again the volume constitutes something of a breakthrough. Scholars in the United States, under the influence of the late Professor Perlman's trenchant analysis, have assumed that there is a tendency for working-class action to move naturally in the direction of business unionism unless diverted by very strong extraneous pressures. A logical policy conclusion of such an analysis has been for scholars and trade unionists to recommend the removal in newly developing areas of the "barriers" to natural growth.

What clearly emerges from the evidence is that the pattern of working-class organization in newly developing societies is not likely to show the conservative, essentially nonpolitical characteristics of American business unions. More important, it is unlikely that private collective bargaining will emerge in any significant sense. Instead, for reasons inherent in the process of contemporary economic development, the state is likely to play the major role in determining conditions of employment and work. Consequently, trade unions, in the American sense, are likely to play an insignificant part in the decision-making process.

Each of the individual essayists is obviously troubled by these implications. All implicitly operate with the model of American trade unions and American collective bargaining as the desirable norm of behavior. This haunting ideal seems all the more precious because we have tended to identify such union and collective bargaining institutions as the necessary bulwark for the growth and perpetuation of an effective democratic society. Nevertheless, the circumstances of these newly emerging economies make such institutional developments unlikely. A logical conclusion might be that economic development in the contemporary environment cannot, therefore, produce democratic societies. Galenson, in his effort to cast up some policy conclusions, is less pessimistic. However, it seems to this reviewer that his suggestions in this regard are particularly lame.

We have seen that late industrialization is producing different labor movement and industrial relations patterns. It may also be necessary to recognize that even in those newly emerging economies which are committed to democratic values, novel institutional arrangements for democratic participation are likely to emerge. It is possible that free collective bargaining may not be one of these institutions. To say this is not to criticize the authors of these essays. Such a suggestion means that in this regard we must await the insights and advice of the political scientist.

As is to be expected, there are weaknesses in each of the individual essays but lack of space forbids giving detailed attention to these. Each essay is a summary of a much longer monograph either already published or in the process of publication. It is possible that some of the defects may have resulted from strenuous efforts at condensation. One interesting weakness of the country studies is the tendency of each of the authors, in varying degree, to consider the characteristics of labor force development and behavior in his region as more distinctive than is in fact the case. However, Galenson tends to put some of the issues into better perspective in his introduction and the careful reader will be able to do this even more.

Morris David Morris

University of Washington

Linear Programming: Methods and Applications. By Saul I. Gass (New York: McGraw-Hill, 1958. Pp. xii, 223. $6.50)

This is an excellent book. It is also an uncompromising and difficult book. In less than ten years, counting the Cowles Commission Conference volume as the start, there has been a remarkable output of linear programming texts and monographs — good, bad, and indifferent, for the theorist, for the businessman, for the serious student, and for the ten-o'clock scholar. In the long list, this book stands high for clarity, especially for the student who wants to learn how to set up and solve programming problems, and rather low for the reader who expects a quick introduction to the *algorithm* everyone seems to be talking about.

Linear programming is a technique for solving problems of maximization. Economic problems (using the adjective broadly) typically require that scarce resources be used as efficiently as possible, given some objective (e.g., profits, welfare, growth) and some restrictions (e.g., technology, tastes, capacities). Economists have been solving problems of maximization and efficiency in marginal terms since the eighteenth century. Until this century, however, not even the mathematically adept could feel that marginal analysis suggested convenient computational procedures for solving empirical problems. It was not until the well-behaved, continuous functions of marginal theory could be replaced by relationships involving linearities, discontinuities, and constraining inequalities that convenient solutions were found. Mathematically, it meant translating the economic problem into the maximization of a linear objective function, subject to a set of constraining linear inequalities. Finding maxima under these conditions is the subject of linear programming. The book at hand is an excellent treatment of the techniques of describing maximizing problems in practical form and of finding solutions.

Most programming text authors put the mathematical background at the end of the book. Mr. Gass, happily, puts the basic algebra at the beginning, where it has heuristic, if not aesthetic, advantages. But less happily, his presentation of the algebra is not sufficient for the uninitiated to move ahead to convex sets. Nor is his development of the material rigorous enough for a reader with some understanding of matrices and vector spaces to feel comfortable about the relationship between the algebraic statement of the programming problem and the geometry of convex cones. This is a difficulty with almost all the texts in the field. The mathematical summaries are generally insufficient as introductions and unnecessary (or laden with wrong emphases) for the reader who has done the work necessary to use the matrix algebra.

In the second part, on theoretical and computational methods, Mr. Gass is at his best. His best is to be strongly recommended. The discussion of extreme point solutions and the simplex procedure is clear and well designed. Working through his simplex tableaux in Chapters 4, 6, and 7 is the most useful introduction to the computation techniques that I have seen. The chapter on dual problems, which are always difficult to present, suffers from the author's omission to make clear the meaning of the dual. It may be that economists, because they can naturally present the dual as the valuation and pricing obverse to the allocation problem, have an advantage here. It is an advantage worth borrowing. Finally, Mr. Gass offers an excellent discussion of parametric programming — the problems of solution where the cost functions or price ratios are permitted to vary. In this case, curiously, techniques with important potentials for economic analysis seem to have been skimped by the economists (with one or two exceptions).

The third part of the book presents a variety of applications in rather kaleidoscopic fashion. Unfortunately, these are not in the form of worked-out, reasonably full-scale problems. Fewer applications, each dealt with as fully as was Frederick Waugh's diet computation, would have been more useful than the catalogue chapter in the text. (The selected catalogue in the bibliography, expanded or as is, could have carried the burden.) The applications are suggestive but may not indicate much for the reader who does not already have some familiarity with the literature. The chapter will not be much help to the economist who needs an opportunity to work through some real problems. The introduction to the theory of games is clear and suggestive, especially in the brief statement of the equivalence of the game problem and the programming problem.

It is perhaps unfair to complain that an author who has introduced difficult computation procedures with unusual, step-by-step clarity has, on the other hand, skimped on the applications. Mr. Gass, after all, has an unmistakable comparative advantage. The applications can be supplied elsewhere, but the economist and his students will have a difficult time finding a replacement for Mr. Gass' exposition of programming methods. This book will not do the whole job, but it will be a rewarding text for the economist seriously concerned with implementing linear programming techniques.

Alfred H. Conrad

Harvard University

The Economy, Liberty and the State. By Calvin B. Hoover (New York: Twentieth Century Fund, 1959. Pp. 445. $5.00)

The Economy, Liberty and the State is the work of a first-hand observer of the economies of Russia and the West. Dr. Hoover is a writer and teacher who has rounded out his academic studies of totalitarian and democratic systems with six trips to Russia, including a

1929-30 residence in Moscow, a residence in Berlin in 1932-33 during which time Hitler came into power, and more recent short trips to both Western and Eastern Europe.

The volume provides interesting reading for the informed man-on-the-street, possible collateral reading for college students, and intimate detail for mature scholars in the area of comparative economic systems. There are four chapters on Russia and the USSR, three on the United States, and four on selected European nations. These eleven chapters are largely descriptive and deal mainly with the last three decades of economic and political change. Two chapters are analytical, and Chapter 12, "Economic Systems and Liberty: Analysis of the Record," is in this reviewer's opinion the high point of the book.

As Dr. Hoover states at the outset, "This study is inevitably in a large measure a personal appraisal." One basic appraisal is that "by far the most important difference between life under the Soviet system and life in the United Kingdom, the United States, France or West Germany is the degree of personal freedom" (p. 347). The author feels that major Western powers are currently in almost no danger of turning to collectivist economies, barring atomic warfare and deep depression. On the other hand, he feels there is very little likelihood of the USSR's providing either the personal or the business liberties now found in the West. The development of such liberties is unfortunately his main hope of averting large-scale war.

Undoubtedly most readers will find Dr. Hoover's appraisal of Soviet growth a sobering consideration. He feels moreover that their progress is likely to continue, and that 6 percent is a reasonable rate of growth to expect. This is about double the long-run rate of growth of our economy. The United States has retained its relative productiveness and its personal liberties, in contrast to business liberties, as the economy has changed from an "individual enterprise, laissez-faire, private-property economy" to "Welfare Capitalism, Progressive Capitalism or simply the Organizational Economy." No reversal of the New Deal trend is foreseen; in fact, Chapter 9 is entitled "The Conservative Acquiescence in the Changed American Economic System."

The mixed systems of Western Europe have evolved into economic condominiums wherein there is joint rule, not always evenly balanced, by the bureaucracies of government, industrial organization, and labor organization. One of the paradoxes in Dr. Hoover's analysis is that there appears no close correlation in the history of the United States and Western Europe between the degree of state intervention and net limitations on personal liberty. This is a quite different experience from the stifling of personal liberty under Nazi, Fascist, and Soviet systems. Personal liberty in any nation stands in danger of being lost during political or economic crisis, and this danger varies directly with the lack of democratic traditions.

The Economy, Liberty and the State crosses the academic areas of economics and politics. It does so almost entirely in a descriptive plane, though sometimes from the point of view of economic theory and infrequently from the point of view of political theory. Generalizing about recent history is very difficult, though probably provocative to the reader who has lived during the making of such history. The book meanders a little, displays an overfondness for unresolved paradoxes, and occasionally lapses into assertions such as that during Eisenhower's Administration corporate managements have "felt that advances in wages must be at least as large as those under previous administrations if the politically vital votes of labor were to be won" (p. 251). If this review, however, has whetted the reader's appetite to read the book, it has served a useful purpose, for the book is a real contribution to the literature of economic systems.

Dwight P. Flanders

University of Illinois

Decision-Making and Productivity. By Seymour Melman (New York: John Wiley, 1958. Pp. xii, 260. $7.00)

This book does deal with decision-making and with productivity, but their juxtaposition in the title may be misleading to prospective readers, as it was to this reviewer. For the most part, the book is a case study of collective bargaining and the decision-making functions allocated to management and the workers, separately or jointly, at the Standard Motor Company at Coventry, England. The data, based on records and personal interviews, are largely representative of the period 1950-53, but comparisons are also made with conditions existing prior to a major contract of 1949.

About one-third of the text is a description of the union organization, the evolution of collective bargaining, and the scope and process of worker decision-making. Melman shows that the collective bargaining agreement gives workers direct participation in various areas of decision-making. They include terms of employment, such as a guaranteed weekly wage; work time, including workweek, overtime, and holiday provisions; deployment, such as details of kinds of jobs held and movement of workers among these jobs; job performance, including job definitions and work load; and compensation.

There is nothing new about the idea that, whenever a collective bargaining agreement is reached, workers have participated in the determination of employment, wages, and other matters directly affecting their well-being. This, of course, may also be referred to as decision-making, even though it is not customarily identified in such terms. Melman takes a further step in describing the participation of workers in decision-making. He says, for example, "terms of employment, usually initiated by the workers, and agreed to by management, actually comprise, in their effects, decisions on the conduct of production." This is just another way of saying that an increase in the cost of labor puts pressure on management to increase its productive efficiency. The decision-making aspect of this and other similar kinds of activity is frequently repeated or illustrated throughout the text. The repetitive emphasis on decision-making and decisions makes the reading somewhat cumbersome.

Only a small part of the book deals with decision-making by management since, as Melman points out, much literature is already available on the general subject. He covers briefly such familiar matters as the methods, scheduling, and supervision of production, cost control, and labor policies at the Standard Motor Company and devotes a short chapter to the rise of administrative overhead. In this section, the author indicates that the ratio of administrative to production employees at Standard had not increased since 1948 while in the motor vehicle industry as a whole it showed a sustained rise. He ascribes this to management decision-making, intertwined with the decision system of the union.

The effect of decision-making on productivity is introduced with a discussion of alternative costs of labor and machinery. Figures are given to show that average hourly earnings of production workers in the Standard organization were substantially higher than those in the entire motor vehicle industry and higher than for comparable occupations in the Coventry area. At the same time, as a reflection of alternative costs and as a measure of relative mechanization, electric power used per worker man-hour was higher at Standard than in the industry.

The productivity comparison, which logically follows, is limited to a few figures on trends and annual variations at Standard and on ratios of output per worker, per value of net fixed assets, and per value of stock and work in progress at Standard compared with those of other parts of the motor vehicle industry. Further comparisons made by Melman show that productivity of the Coventry plant in the manufacture of tractors, its major product, compares favorably with that of two tractor plants in Detroit. It is to be noted that there are very few quantitative examples of specific decisions and their direct effects on the productivity of the firm.

The last two chapters deal with conflicting policies of labor and management, attempted Communist influence on the union, and problems of a strike in 1956. These are rather interestingly described against the background of the history of collective bargaining at Standard Motor Company and in the framework of Melman's definitions of decision-making by management and workers.

Leon Greenberg

Bureau of Labor Statistics

The Economics of Competition in the Transportation Industries. By John R. Meyer, Merton J. Peck, John Stenason, and Charles Zwick (Cambridge: Harvard University Press, 1959. Pp. xvi, 359. $7.50)

The present study is an outgrowth of a research project originally sponsored by the Canadian Pacific Railway for the purpose of studying various problems confronting that carrier and the Canadian economy generally. The basic message of this volume, in the authors' words, is that "the major reason the transportation industries have not grown and prospered as much as most industries is that transportation has been overregulated" and that "the soution to excessive regulation is not to ncrease but to decrease the scope of ;overnment controls" (p. vi). Accord-ngly, the study "assesses the extent of ompetition in transportation markets .nd describes what the industry's prob-.ble structure would be if these com-etitive forces were released from reg-latory restraints" (p. 1). Although the ideal of regulation is to achieve, .t least roughly, the results of competi-ion in situations which are not entirely .ompetitive," this objective has not een achieved, according to the au-hors, because of two circumstances: "(a) the particular character of the nterplay between economic and polit-cal factors that has conditioned and nolded regulatory action in this coun-ry; and (b) the failure of regulatory nd managerial thinking to adjust to he changes brought about by impor-ant technological innovations of the ast thirty-five years" (p. 3).

Two chapters are devoted to a de-cription of the nature and advantages f the multiple regression technique for ost determination and its application o the costing of railway services. Two dditional chapters are devoted to a eview of available cost estimates for ther forms of transportation, with the ddition of some new data covering vater transportation and trailer-on-flat-ar service. The latter data are par-icularly welcome in view of the paucity f cost information relating to this type f transportation service. With regard o subsidies the conclusion is reached hat user charges on gasoline-powered eavy trucks (50,000 to 60,000 pounds ross weight) currently come close to aying a proper share of highway costs in many states but that user charges on diesel-powered trucks fall short of doing so by a considerable margin, and that the share of the airport and airway subsidy assignable to commercial air transportation is too small to have a significant influence on the allocation of traffic among competing agencies of transportation. However, the heavy air mail subsidy currently paid to local-service airlines is not mentioned.

On the basis of the foregoing cost data the authors undertake to determine the most economical allocation of traffic among the different agencies of transportation. This involves two steps. First, there must be determined those segments of traffic which a given agency can handle at both lower marginal cost and lower full cost than its nearest competitor; in these instances, of course, the carrier with the lower full cost properly carries the traffic.

Second, after these comparisons have been made, it must be determined if there is any remaining traffic, for which the agency having a lower marginal cost when its plant is not fully utilized now has a higher marginal cost because additional traffic cannot be handled without overutilization of the plant or plant expansion. In this case it would be more economical for the agency having unutilized capacity to handle the additional traffic, even though its marginal cost is higher than that of the other agency when both have unutilized capacity.

Applying these principles it is found that for distances under 600 miles most bulk commodities should move by water where water transportation is available and that where the latter is not available, all liquefiable commodities should move by pipeline to the extent that technology and volume permit. In the case of high-value commodities both rail carload and rail piggyback operations were found to have a substantial advantage over water package freight and truck operations, with a strong indication that piggyback should be substituted in many instances for straight rail carload movements. Rail first-class passenger operations were found not to be very economical and the same was found to be true of coach service except in short-haul, high-density operations. An expansion of short-haul bus and long-haul air passenger services is indicated. The principal case of overlapping costs was found to be between rail and truck operations. It was found that 37 percent more revenue ton-miles could be handled by rail than by truck for the same outlay, "so that the continued existence of railroads is economically justified even after elimination of much bulk commodity and passenger traffic" (p. 167). At the same time this does not indicate the elimination of intercity truck operations, "since there are clearly particular instances in which truck costs would be substantially less than rail costs" (p. 167). One important implication of these findings is that an economical allocation of traffic would require more emphasis on development of urban road systems and possibly less on development of the intercity system.

In the authors' view the achievement of an economical allocation of traffic along the foregoing lines requires a rate structure based primarily on long-run marginal costs; the fact that the actual distribution of traffic falls short of achieving this efficiency norm is held to be due largely to the almost universal adoption of value-of-service rate-making by the transportation industries. However, the authors are careful to recognize that within limits the latter type of rate-making is desirable.

> Price variations to meet a short-run downturn in demand, to utilize off-peak capacity, and to meet competition are all necessary conditions of both competition and an efficient allocation of scarce resources of an economy. In the railroads, particularly, there is considerable merit in demand-oriented pricing which achieves a full utilization of capacity and thus minimizes the burden of fixed costs. . . . Competition could force rates into line with relative long-run marginal costs in such a way as to create a new and more efficient allocation of transportation resources without a regulatory prescription of cost-oriented rate structure, and, at the same time, might permit the limited survival of demand-oriented pricing that contributes to efficiency. (pp. 168-69)

The authors object to value-of-service rate-making as presently practiced both because it is used too extensively and because it does not in every case meet two necessary conditions, namely, that the reduced rates more than cover direct costs and that the traffic will not move at higher rates.

Since the authors recommend rate structures based primarily on long-run marginal costs, which in turn implies competitive market structures, they devote a chapter to an investigation of prevailing market structures in the transportation industries and the extent to which they are, or can be made, workably competitive. While they disclaim any attempt to establish definitively whether workable competition is possible or presently exists in each of the various industries, the general conclusion of this "limited survey" is that, except for pipelines, "the existing market structures (and hence the possibility of workable competition) in transportation lie within the range of market structures observed in nonregulated sectors of the economy" (pp. 238-39). It is implied that where competition is not presently workable it could be made so by certain institutional changes, notably the abolition of rate bureaus.

This conclusion provides the foundation for the major policy recommendation in the final chapter of the study, namely, that primary reliance be placed upon antitrust controls, with rate regulation confined to "those very limited areas of transportation in which monopolies continue to exist, e.g., the overland rail carriage of a limited number of bulk commodities that are technologically incapable of pipeline transport, certain pipeline operations, and the railroad line-haul facilities needed to provide piggyback service" (p. 270). Consistently with their emphasis on competitive controls the authors reject sweeping railroad mergers in favor of a "limited merger program which involves railroads too small for fully efficient operations and which maintains the possibility of competition" (p. 260). Mergers of small truck lines and rail-truck mergers are approved. As an offset to the possible reduction of competition resulting from mergers the authors recommend that railroads, in their piggyback operations, be required to handle the trucks of common, contract, and private motor carriers on the same basis as their own trucks, and that "the present minor and major restrictions on private, contract, and non-scheduled carrier entry should be eliminated, except where real questions of public safety are involved" (p. 263). A liberal policy of permitting abandonment of unprofitable or uneconomical services and facilities is recommended, especially in the case of rail passenger service. Subsidies for rail commuter service are not favored. User charges for publicly provided transportation facilities are approved in principle and further research on the costs attributable to various classes of users is recommended.

While many portions of this study invite detailed comment, the reviewer will confine himself to three general observations. First, it may be noted that the validity of the multiple regression technique as applied by the authors in the determination of railway costs has been questioned. An earlier study, in which three of the authors participated, entitled *Avoidable Costs of Passenger Train Service,* which used this approach, was extensively criticized when introduced as evidence in the recent ICC passenger deficit investigation.

Second, and more fundamentally, while the authors' thesis concerning the need for changes in the present structure and policies of rate regulation would probably be widely accepted, up to a point, it is the reviewer's opinion that they have somewhat overstated the advantage of substituting antitrust controls for all but a minimum of regulation. Thus the authors contend that regulation has resulted in excess capacity in trucking; yet the existence of self-imposed restraints on rate reductions, which admittedly do exist in oligopolistic markets, coupled with free entry of contract carriers, which the authors recommend, might well create a Chamberlinian "tangency case" and even greater excess capacity. Again, the authors hold that, except for pipelines, the range of market structures in the transportation industries is similar to that of unregulated industries, thus implying that since we have been content with the degree of competition maintained with the aid of antitrust controls in the latter area we may properly rely primarily on antitrust regulations in the transportation field also. However, no one would contend that "workable" competition in the unregulated area achieves the authors' ideal of competitive resource allocation; hence even if most of the authors' strictures concerning the adverse effects of present regulatory policies are accepted as valid, this is not equivalent to a demonstration that replacement of most regulatory controls by antitrust regulations would necessarily produce better results. Certainly "workable competition" does not constitute an objective standard for measuring the comparative merits of the two approaches.

Finally, the reviewer notes two omissions: (1) the authors do not consider the allocational effect of differences in tax burdens (other than user charges) among the various transportation agencies; and (2) they do not consider the likelihood that it may be desirable for national defense reasons to retain some rail facilities which would not be economically justified in peacetime. However, despite the foregoing reservations the reviewer regards this as one of the most significant works on the general subject of transport coordination which has come to his attention and one which is likely to prove an indispensable starting point for further research on this subject.

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